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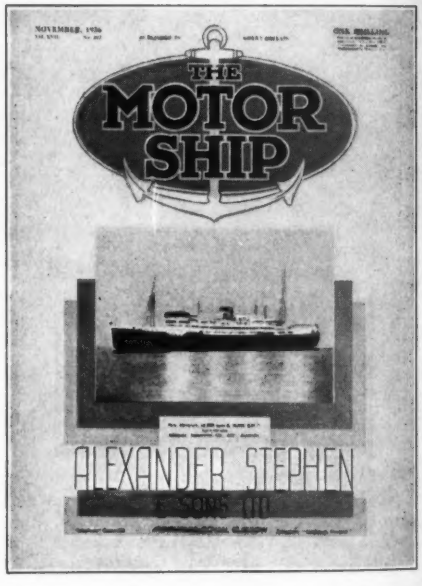

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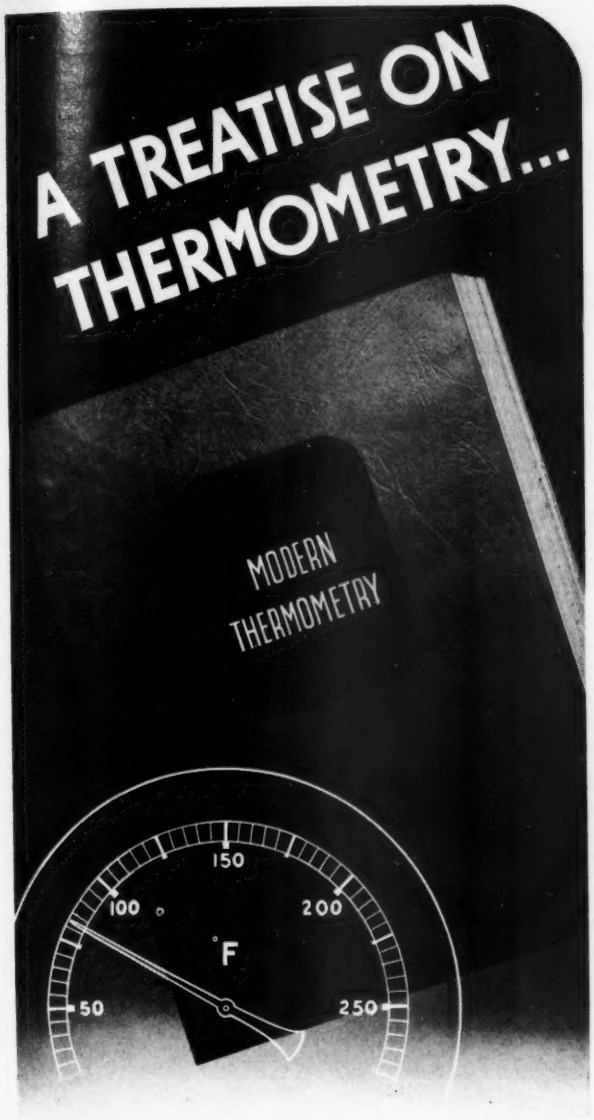

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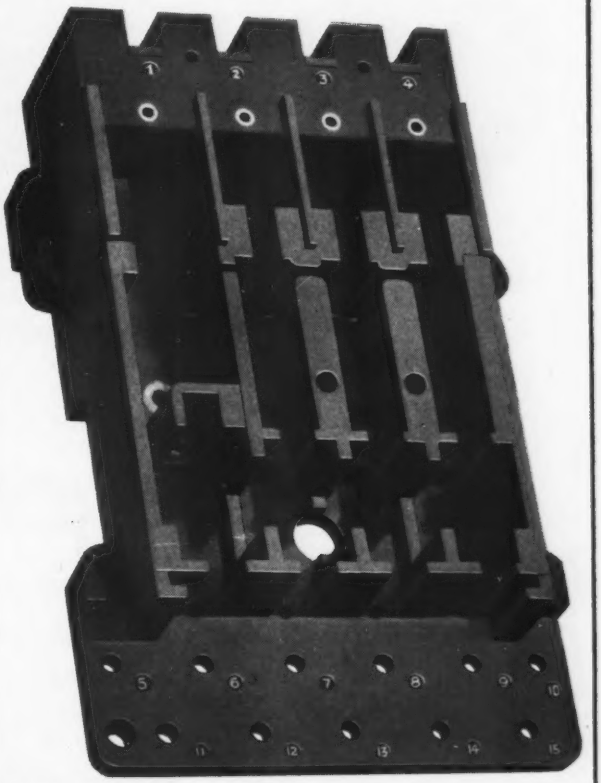

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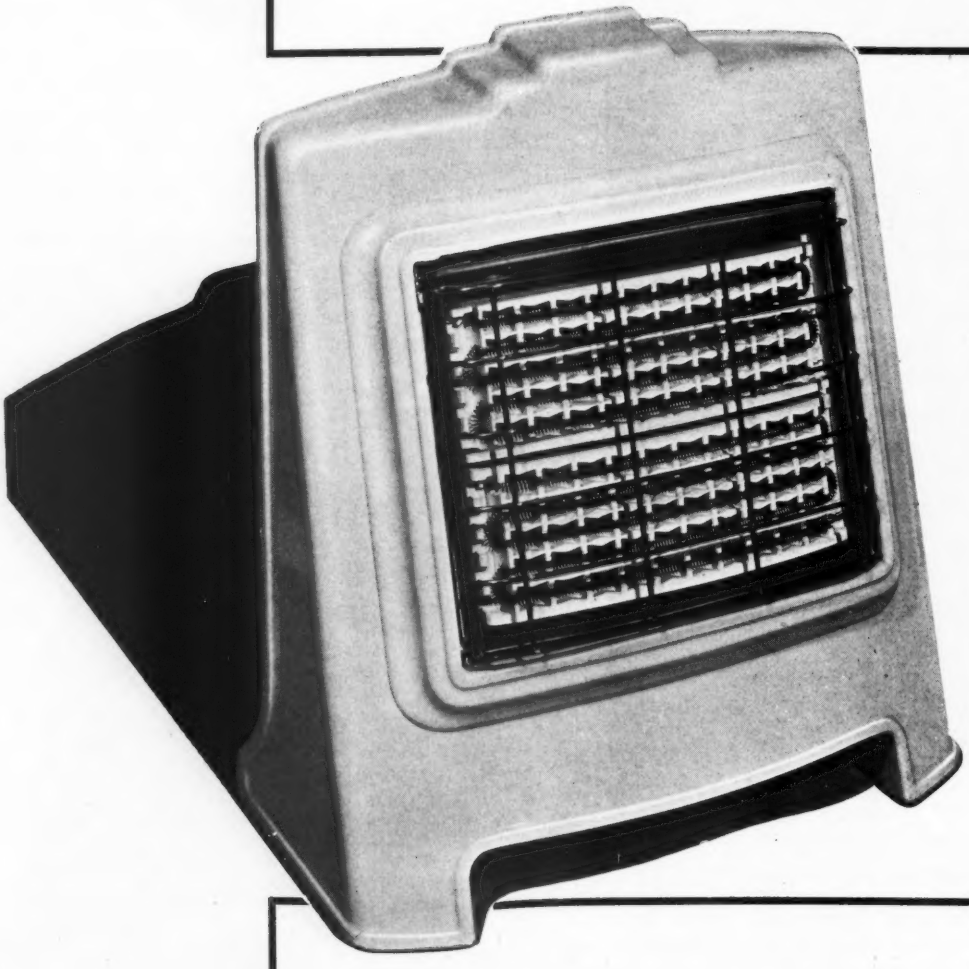

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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials.

Vol. II. OCTOBER, 1938 No. 17

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Vol. II. No. 17 OCTOBER, 1938

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

Proprietors - - TEMPLE PRESS LIMITED
Managing Director - ROLAND E. DANGERFIELD

Editor - - M. D. CURWEN, B.Sc., A.I.C.
Offices - 5-17, Rosebery Avenue, London, E.C.1

PROTECTION IN WAR-TIME

IN spite of peace and rumours of peace it is obvious that the past few weeks have awakened in the whole nation a sense of the danger to which it has been exposed, and from which it will not too rapidly be released. This, we hope, will prove a blessing in disguise and may yet result in a determination to be prepared and to overcome any future threat to our well-being. It certainly appears that Britain's unpreparedness brought about by desire for peace does not in fact induce peace but paradoxically induces war. It is horrible but true.

It is especially noteworthy and commendable that A.R.P. has not been severely slowed down since peaceful negotiations began on September 30. Gas-mask fitting, evacuation, sand-bagging and teaching of air-raid precautions to be taken are being rapidly organized throughout the country.

But there is one aspect of the dangers to the public that does not seem to have been envisaged and which to us appears of much greater importance than dangers due to poison gas.

Indeed, the dangers of poison gas have been exaggerated in a measure out of all proportion to its importance. The chances of gas raids with gas bombs are small compared with those from high explosives; the chances of aeroplanes spraying clouds of poison gas are almost nil; the dangers from gas are local, and, moreover, the gas mask is extremely efficient.

The greatest hazards to life are the effects of high-explosive bombs, the splinters flying from them, the fall of masonry, and perhaps more important than anything else, the danger of flying splinters or shrapnel from our own anti-aircraft guns. Since even if a small squadron of enemy aircraft passed over a town all the anti-aircraft would join in the fun; only a few bombs may be dropped, but thousands of shells would be let off and rain on the town.

Against this no protection has been vouchsafed the public, and it is one which, we submit, is deserving of earnest attention. We should see that all air-raid wardens, all police and police substitutes, and eventually the public, are adequately protected at least by a reasonably protective headgear. Soldiers have their tin hats, and there is no reason to withhold the protection from the citizen, who we are assured will be as much in the front line as the soldier.

Then let us plump for protective helmets, and let them be of plastics. They must not be of steel, for steel will be required elsewhere. Besides, a light hat is wanted and not one that weighs a pound or so. The helmet of synthetic resin has already been moulded and is widely used in mines by men working underground, although not in this country. They have proved their usefulness time and time again in saving life. They are robust, tough and comfortable and would, without doubt, save head injuries even from spent shrapnel. They could be rapidly turned out, provided the moulds were in existence, at a minimum rate of 500,000 a week by the plastics factories of the country, a rate which could be rapidly increased. They should be considered a protection every bit as much as gas masks. And may neither ever be used!

There seems little doubt that a box for respirators is required if the public are to keep them for a lengthy period. We understand that wooden boxes have been proposed, but surely this matter is one for solution by plastics. A cylindrical box with a screw cap made of synthetic resin would be admirable for the purpose, especially as a container as nearly airproof as possible is required.

Milk-oh!

IN these modern days the gentle cry of milk-oh! no longer rends the morning air to disturb our child-like slumbers. But we still have with us the clatter of milk bottles, and although to some it serves the purposes of a Lancashire "knocker-up," yet to our southern and, consequently, more delicate ears, it merely helps to correlate our miserable town existence still closer with Dante's Inferno.

It is true that during the past few months an ingenious inventor, probably having been driven half mad by the aforesaid noises, has devised a new type of carrier

in which the recesses for the bottles are lined with rubber. But does it go far enough?

We do not presume that those who thought of the plastic milk bottle considered it only as a means of making our early morning lives more pleasant and of leaving our dreams undisturbed. Anyway, the plastic milk bottle, made from cellulose acetate sheet, is about to be upon us. We shall welcome it when it is.

The *Evening Standard* in a recent issue gave news that some big commercial and financial developments may soon be announced in connection with the production of acetate milk bottles and that a new process for such manufacture had been developed. Such bottles would be, of course, most suitable for the purpose, and it is stated that they would be cheap to produce.

What stage in the negotiations has been reached is not quite clear, for we have received a communication from the London Industrial Finance Trust, Ltd., the company which we understand is carrying out this development: "We are informed by the Editor of the *Evening Standard* that you have made inquiries regarding the recent note on cellulose acetate. As the development of this home industry is in our hands we are able to inform you that, while for certain products the process is a proved success, experiments are being conducted in other directions, and these, while exceedingly promising, must be concluded before the potential market is approached."

The disadvantages of the glass bottle are sufficiently important to become almost a liability to the industry and, of course, it is the customer who pays for the disadvantages. The percentage of breakages is so high that the average life of a bottle is put at only 12 journeys. There must also be included the important cost of cleaning and sterilizing the bottles before re-issue.

The manufacture of the acetate milk bottle is proposed on the basis of the non-returnable type, that is the bottle is to be thrown away after use, saving cost of collection and cost of washing. Actually at the present price of acetate we have little doubt that somebody would make quite a thriving little business of collecting the waste.

"If these bottles," says the *Evening Standard*, "come into general use, 80 tons of cellulose acetate will have to be manufactured daily." We do not know why the figure of 80 tons has been taken, but presuming that an acetate bottle would be about 2 oz. in weight, it represents 1,433,600 bottles to be manufactured each day. There are about 47,000,000 people in this rough island of ours and if we presume that about one in four use bottles the above number of bottles represents only about 10 per cent. of the possible business. Still, 1,433,600 is a fairly astronomical number to be turned out per day, although 80 tons of cellulose acetate is not an impossibly high one for this country. Anyway, we wish the endeavour good fortune.

We should like to see the plastic bottle especially for one reason. If the milkman pushes round a couple of hundred glass bottles all day he pushes round a couple of hundredweight, and that is no easy job. If he pushed round a couple of hundred plastic bottles it would be a mere 25 lb.

Art in Cast Resin

OUR publication last month of two photographs showing a Venus and a symbolic fish carved by hand from Erinoplas, the cast phenolic resin made by Erinoid, Ltd., evoked admiration from all quarters. It is interesting to note that cast resin is being also adopted in America for the production of what might certainly be called object d'art. The September issue of *Modern Plastics*, the well-known American journal, publishes some excellent photographs of this type of work. But they do not appear to be hand-carved. Instead, a new technique of casting the resin into rubber moulds containing the shape to be finally obtained has been developed. Curiously enough, one figure is that of a Venus made from Prystal, a transparent phenolic resin. There are also included photographs of two sets of "animal" book-ends, one of seals and the other of ducks. Both these sets have been cast in rubber moulds of a resin made by the Bakelite Corporation.

Wrapped Bread

The problem of delivering bread to the public in a hygienic manner by a suitable wrapping has again come to the fore, since the public has seen so much of the wrapping of many commodities from chocolate boxes to blankets. One of the most recent of such packs is one for sparking plugs and consists of a small upright container to take one plug, with the sides cut away to show the contents. The whole is wrapped in "Cellophane" or some similar material.

The problem of wrapping bread seems much more urgent than any of these, but, on the other hand, is not simple. There is first the added cost to a food whose price must be kept as low as possible and, secondly, there is the problem of keeping the loaf fresh. The whole matter was examined by a responsible committee some five or six years ago and was discussed, we believe, at Blackpool at a meeting of the Society of Chemical Industry.

If a wrapping were possible which did not permit of loss of moisture by the loaf, a great step forward would be made. On the other hand, the problem of hygiene may be considered by some to outweigh any other consideration.

In our next issue we hope to deal with this matter in greater detail.

Whale By-products for Plastics

A good deal of interest has been created by recent successful attempts to use swollen fibrous masses obtained by swelling and comminution of the skin after removal of the blubber for new protein plastics. These materials can be extruded to form coarse threads or moulded under low pressure into various shapes. Apparently the source of supply is quite considerable and there is a healthy demand for the plastics which, apart from their possibilities for moulded articles, can be used in the production of artificial leather.

A New Temple Press Building

ON Wednesday afternoon, September 28, the ceremony of laying the foundation stone of a new Temple Press building was performed by Mrs. Roland E. Dangerfield, wife of the Managing Director, who said: "I declare this stone well and truly laid, and I pray that it may be a symbol of peace and prosperity in the future."

Mr. Roland E. Dangerfield, referring to the political situation, said that "in spite of everything we hadn't got our tails down yet." He hoped that if the general prosperity of the country improved the company might be forced to put up an even larger building.

The new building is situated a few hundred yards off the south-east corner of the intersection of Farringdon Road and Rosebery Avenue, and will be fronted by a new or widened thoroughfare which will by-pass the Farringdon Road traffic. When completed in a few months time it will provide for a printing works on the most modern lines with flow production similar to that of the best-equipped factories in the automobile industry.

The Roll Top Package

By means of cellulose acetate sheet, packaging experts are able to make more advanced and imaginative containers for a wide range of goods. The roll top package is an example of the versatility of this material

THIS novel idea, which was so cleverly and successfully exploited by the International Silver Co. and Pilliod Cabinet Co., of America, for their Revelation silver chest, is well worthy of attention by packaging experts in this country.

The chest, which is illustrated below, is a wooden box with a cellulose-acetate top, made in such a manner that it operates very much on the basis of the old-fashioned roll-top desk. The ribbed transparent cover protects the merchandise from dust, dirt and tarnish while permitting full display of the product within. Since the cover rolls out of sight when desired, the individual items are readily accessible for examination or use.

The success of every new package is assessed by the reception given to the product on the retail market, and it is, therefore, particularly interesting to record that, since the introduction of this new silver chest, sales have been outstanding and the company is completely satisfied with its display and sales ability.

A well-known American packaging expert with long experience of his own home market says that when a package dresses up a product sufficiently and sensibly enough to make it appear an ideal gift, then success is 95 per cent. assured. The Revelation chest has, during its short life, been a general favourite with wedding-gift hunters, and also been first choice with many thousands of people looking for anniversary and seasonable gifts of a really pretentious nature. It is sound psychology to remember that it is a human weakness to prefer an opulent-looking gift in preference to one that merely appears utilitarian.

There is a wonderful opportunity in this country for similar containers able to make a wide range of products look more attractive and tempting to potential buyers. After tableware, which when new invariably catches the feminine eye, there comes dressing-table accessories, needlework outfits, artists' sundries, writing requisites and a dozen other useful articles which lend themselves to display.

Acetate sheet, which was used for the Revelation chest, is fully transparent and colourless and offers many exceptional advantages. It protects as it beautifies; lends itself very willingly to complex designing; enhances decorative effects and brightens colours. On account of its flexibility, toughness and durability acetate sheet assures that packages are lasting as well as good looking. It is easily worked and can be moulded, drawn or folded, takes printing of all colours without wrinkling and is consistently uniform.

The Revelation chest, embodying the use of cellulose acetate, was the 1937 Gold Award winner of the All-America Package Competition. The acetate sheet was made by Eastman Kodak Co., Rochester, N.Y., U.S.A.

PLASTICS AND A NEW ART

A publicity display carried out in black on an ivory-coloured background of amino-resin.

INDUSTRIES on the whole progress slowly, the even tenor of their existence being relieved at long intervals by new processes. The plastics industry, on the other hand, probably because of its youth and the fact that it was born in an era of intense technical activity, is noteworthy for the comparative rapidity of such advances.

This industry may be divided into two sections; first, that which produces the raw material, and here there is little necessity to indicate the rapidity with which it has grown and the number of new plastics that has appeared in very recent years; and secondly, that which utilizes the raw material and converts it into the finished form. This latter section, because engineering and economics play important parts, is much less prone to change than the first, which in a sense merely depends on chemical ingenuity and is, therefore, relatively free of outside influence. Nevertheless, there have been rapid movements, and to the older methods of celluloid shaping, casein working and the pressing under heat of moulding powders there have been added more recently the processes of producing laminated materials, of extrusion, of casting resins, and of injection moulding. The modern methods of shaping thermoplastics in sheet form, although derived from those employed in shaping the original thermoplastic celluloid, may also be considered worthy of inclusion.

To-day the industry receives yet another impetus, with results that we feel convinced will fulfil many of the dreams that we have built up for plastics in the realms of art, and will improve the status of plastics in the world outside. Already we have seen how beauty of form and colour are the peculiar privileges of the moulded synthetic resin, of cast phenolic and of transparent coloured acrylic resin. But never before has pictorial representation been developed to such a fine art, appealing so much to the sense of beauty as the present developments we here relate.

For the first time we have in plastics something com-

parable to the production of an etching on a solid and virtually imperishable base, transcending in warmth and detail the carving of ivory.

In our July issue on our Ideas page we gave one example of what this process can produce. We referred to it (it was a scene of a mother and child in arboreal surroundings) as having the texture of a steel engraving of a Boucher picture. Yet it was moulded from an amino-resin moulding powder in an ordinary press.

To-day at their new factory in the Slough Trading Estate, British Artid Plastics, Ltd., have now completed their plant for full production and have given us further examples of this very amazing process for the delectation of our readers.

Perhaps the most striking in this collection are the book and Bible covers, the mediæval subjects being particularly attractive. The pictorial representation of St. George and the Dragon has, we presume, been made from one of the works of Dürer, the famous 15th and 16th century German artist. Both are beautifully produced, and so deeply "etched" are the designs that one receives the impression of a photo-engraving on plastics instead of copper or zinc.

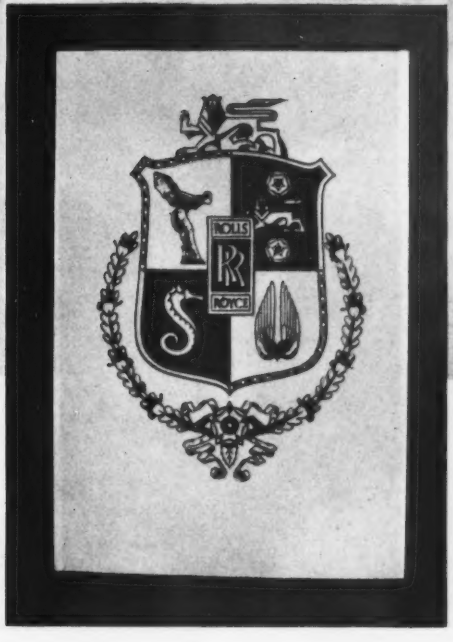
It is, indeed, fascinating to conjecture that it may yet be possible to reproduce from an ordinary photograph replicas in synthetic resin. In the meantime let us consider what immediate possibilities this process presents. There are those which are shown by the accompanying photographs, and, for example, a beautiful panel in a book can become a beautiful panel on a wall, the limitations of size being those usual to ordinary press technique. The plastic container hitherto manufactured and limited in its surface decoration may receive a new lease of life. The plastic plaque for which we have long waited appears at last a real possibility. The wall picture released from its unnecessary frame is now feasible, and one can readily visualize with what joy a series of special subjects for the decoration of nurseries would be received.

The process also offers an enormous scope in the field of publicity, where plastics have hitherto been restricted because of the difficulty of pictorial reproduction other than by the rather crude transfer. The Burberry and Rolls-Royce plates are typical of this work. The "printing" of the letters on these two subjects is especially noteworthy and significant.

The process we hope will have considerable effect on the plastics industry as a whole. Certainly it opens up new fields which hitherto plastics have not been able to enter. It is thus doubly welcome.

(Above) With the exception of the paper calendar the whole has been produced in a press.

(Above) A reproduction of an old print. Note the excellent detail obtained by the process.



(Right) A beautiful Rolls-Royce coat of arms on an "ivory" plaque.

MODERN FURNITURE

FOR THE MODERN BUSINESS MAN

It is a strange commentary on life that the business man, who so often boasts of the modernity of his home, is content to spend some fifty per cent. of his waking hours, and the most strenuous of them, in surroundings little removed in inefficiency and uncleanliness from those of the middle of the nineteenth century. They need not be so

THERE has been in the past few years a tremendous change in the design of the house, with the complete elimination of Victorian "knick-knackery," fustiness and overbearing sombreness by clean-lined, colourful furniture intelligently designed to avoid dirt and unnecessary work on the part of the housewife. Just so has there grown a new realization that the business man's office need not be the badly lighted, overcrowded, unpleasing and almost always unhealthy room so general in nearly all the older business houses.

Often in these pages we have told how plastics have a great future in the realm of furniture manufacture, both in the possibilities of creating new designs and as raw materials for hygienic construction; added to these is the unique characteristic of imperishable colour in itself of outstanding importance to health.

Synthetic resin veneers give beauty, efficiency and cleanliness to the modern office.

Naturally enough, the great manufacturers of plastics have blazed the way in no uncertain manner and have offered close co-operation to the important furniture manufacturers. We sincerely hope that this relationship will be strengthened.

This month we were invited to view the new furniture in the office of Mr. Peter Chance, director of British Industrial Plastics, Ltd., in Argyll Street, London, W.1. All that we have already said is reflected in the photographs we publish here. Beauty and cleanliness of design and colour give a rare air of efficiency, spaciousness and hygiene to the whole room.

The furniture was designed by Mr. Peter Chance in conjunction with Fredk. Sage and Co., Ltd., the well-known furniture constructors, to illustrate the possibilities of synthetic resin laminated veneers for attractive modern office furniture.

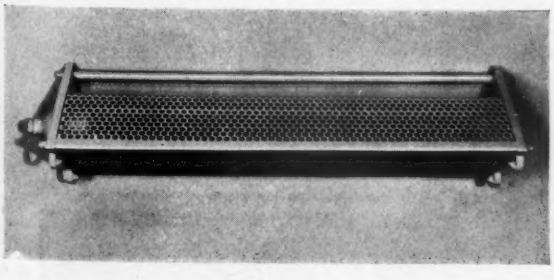
The table-tops are in black "Trefoil" (phenol-formaldehyde) laminated; the front, sides and cupboard doors in pale green "Artmur" (amino-resin) laminated, both of which are manufactured by Bakelite, Ltd. The doors are decorated with the silhouette of a "springbok" or leaping gazelle in a darker shade of green. The handles and edges are formed of strips of aluminium, and on each piece of furniture there is a narrow kicking plate of black laminated, which serves to balance the top surfaces in the same shade.

Now the Plastic Airer

The applications of plastics in the electrical field continue to receive the unflagging encouragement of all engaged in the industry. It is realized that both amino and phenol moulding products are ideally fitted for a great deal of important electrical work, especially domestic appliances, which require all exterior parts to be efficiently insulated.

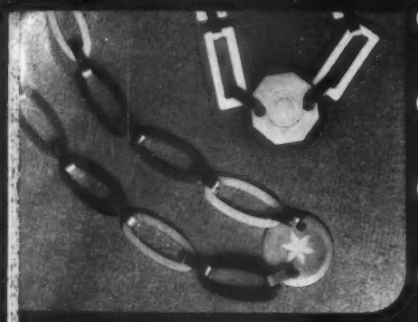
One of the most recent and interesting of these new applications is the use of Beetle or Scarab extruded tubing on a new domestic airer. This is a small device designed specially for airing linen, airing wardrobes or built-in cupboards. It will also air small bedrooms, nurseries, garages, act as a foot warmer, and is an excellent drier for small articles. The rail across the top of the device can also be used as a handle to move the airer about, and is made of extruded tubing manufactured by the Streetly Manufacturing Co., Ltd., in a cheerful colour to harmonize with the metal body. The three colours so far available are blue, green and cream.

Since the manufacture of extruded tubing in amino plastics became a real commercial proposition, a great deal of thought and energy have been devoted to the wide extension of their applications. This new drier is in the vanguard of progress along these lines, and its success will undoubtedly encourage other manufacturers to make generous use of plastics. Unity Heating, Ltd., of Welwyn Garden City, who are responsible for the production of the Unity Airer, are to be congratulated for their foresight in choosing one of the best-known products of the plastic industry for an essential and distinctive part of their new line.



"General Release"—I

New and Interesting Plastic Goods

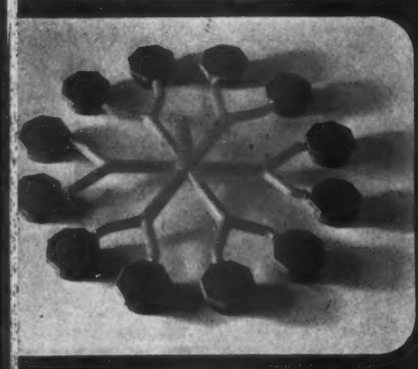


BELTS of Catalin chain in all colours of the rainbow are now all the rage. They are especially popular for summer prints and play-suits, and add a very welcome touch of colour to natural linen and other plain colour.

THESE Bex mouldings by the British Xylonite Co., Ltd., are available in a number of most attractive colours. The moulding on the right is a sweet bowl, and on the left a sugar bowl.

EVEN a cursory examination of these varied examples of work in polystyrol resins will indicate their amazing versatility. The mouldings illustrated were submitted to us by May and Baker, Ltd., as examples of the work now being done with their Rhodolene M polystyrol resin.

HERE'S an interesting innovation in the way of a moulded cap for Esso lubricating oil, put up in handy little cans for home use. The cap protects a metal applicator with which it is possible to lubricate inaccessible parts of lawn mowers, sewing machines, etc.



MOULDED caps for collapsible tubes are now very popular with manufacturers of toilet preparations, and these injection moulded examples are typical of the thousands now being made. These particular examples are moulded of Rhodolene M and well illustrate its suitability for all kinds of injection moulding.

THE traveller who plans to spend some time away from home may now pack his clothes in boxes of transparent Plastacele, made by Du Pont, a lightweight plastic that keeps ties, shirts, shoes and pyjamas spotless and free from the dust of the journey. Strong and durable, these boxes may be cleaned with a damp cloth.

"General Release"—II

New and Interesting Plastic Goods

THESE two examples of Erinoid dress decorations show to excellent advantage the complexity of design and excellent finish now being achieved with this well-known plastic material. It is a general favourite with a large number of manufacturers specializing in the production of high-grade buttons, clasps and dress accessories.

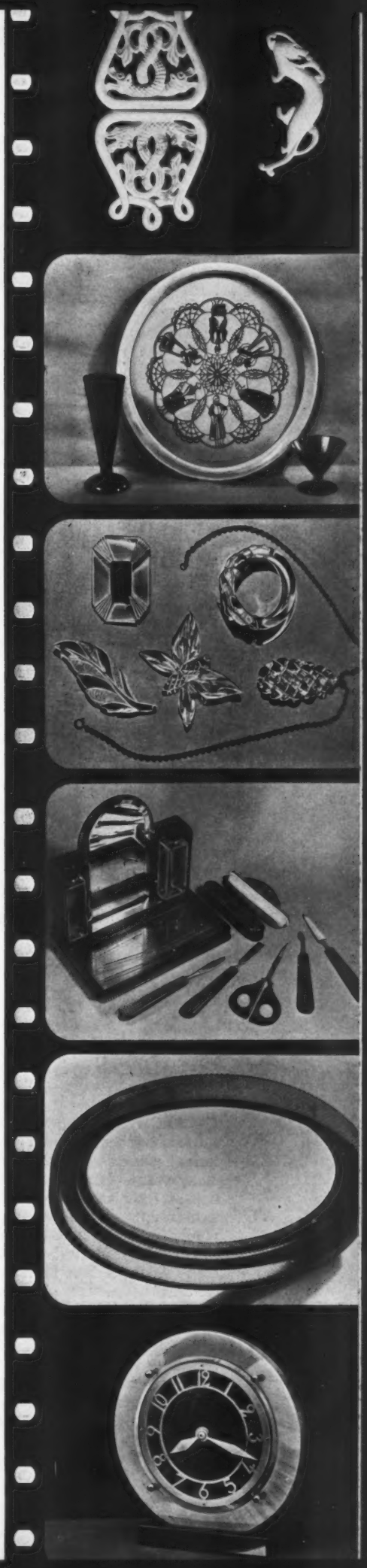
THESE attractive mouldings originate in Hungary, where the keenest interest is now being taken in the production of high-grade plastic goods. The decorative effect on the large plaque has a simplicity and attractiveness which is found only in countries with a rich tradition of the East.

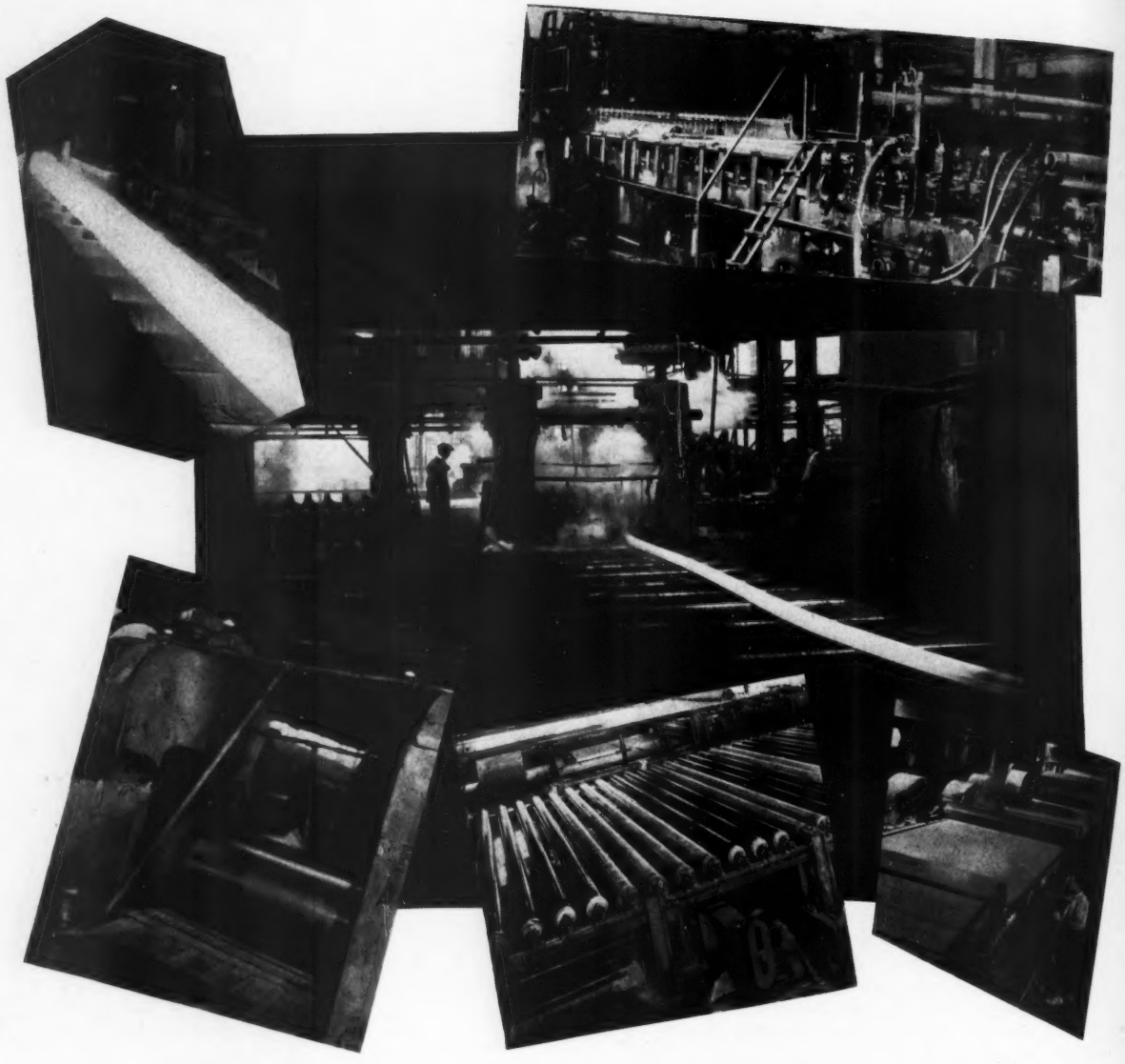
NEW effects are achieved in jewellery by the use of Lucite methyl methacrylate, a plastic resembling natural crystal, recently developed by the Du Pont Co. Note the sparkle and brilliance of the pieces, possible because of the inherent qualities of the plastic and the hand-cutting and carving, which permits the play of light through and within the cut surfaces. The designs include a wide variety of pins, pendants and bracelets.

MANICURE sets are now elaborate affairs, as the modern woman is no longer content with just two or three accessories which she can slip into her purse. This manicure stand made of Xylonite by the British Xylonite Co. Ltd., is designed for a discriminating, one might even say fastidious, public and should prove very popular.

THIS resin-impregnated piston ring for variable-pitch aeroplane screws is made by the Bushing Co., Ltd., of Hebburn-on-Tyne, for De Havillands, and represents a revolutionary departure from normal aeronautical engineering practice.

THE new Temco synchronous electric clock made of Catalin by T.M.C.-Harwell (Sales), Ltd., is available in white onyx finish on black base and also in lacquer green on black base, or all tortoise-shell. The outer ring of the case is cut from a tube specially cast for the purpose, while the base is cut from standard sheet. The two are screwed together, and the Temco movement is centre-fixed to a dial plate screwed into the Catalin ring.





PLASTIC BEARINGS IN MODERN INDUSTRY

SEARCH for the perfect bearing for use in cement plants, paper mills, steel rolling mills and textile factories has been pursued by the engineer and chemist for many years. It was not, however, until the introduction of the plastic laminated bearing a few years ago that an approach to the high standards of efficiency so vitally necessary to industry was obtained, and the results achieved have been so promising as to encourage their widespread application for exceptionally severe conditions of service.

The bulk of the plastic bearings in use to-day consist of paper or various kinds of textile fibres impregnated with a phenolic resin and subjected to heat and great pressure so as to form thick sheets, tubes, etc., from which the bearings can be machined to an extremely high degree of accuracy. A number of small bearings are also moulded from specially developed phenol formaldehyde moulding powders, and these are particularly useful for small machinery and medium and high-speed work, especially in the automobile industry. In general principle these are the two most important methods, but other promising ones are being developed, such as the moulding of chipped laminated sheets and the use of emulsified resins reinforced with special felts and moulded under high pressure.

It is impossible, even if it were desirable, to describe the manufacture of plastic bearings, but it may be taken that all of them are made from phenolic resins reinforced with different fibres, which are quite frequently impregnated with pure graphite to improve the lubricating properties of the bearing.

The American product Insurok, made by the

Richardson Co., of America, is one of the best-known examples of a successful graphite-filled bearing, and it is specially suitable for installations where difficult lubricating problems and hazards are encountered or the bearings are inaccessible.

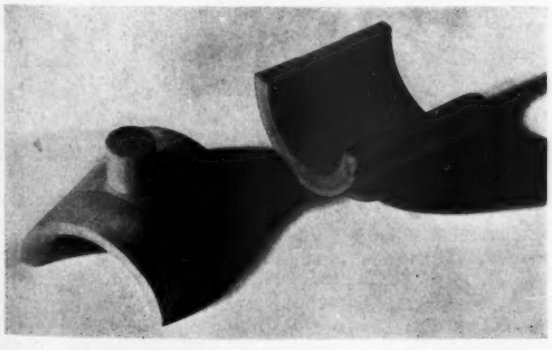
Plastic bearings have a low coefficient of friction, and thus greatly reduce power requirements and costs. In a paper read before the Institution of Mechanical Engineers on October 13, 1937, Mr. G. R. Eyssen made some interesting comparisons between brass and laminated bearing materials. In the case of water-lubricated bearings, which are now most important in paper mills, textile factories and steel rolling mills, brass has an average coefficient of expansion varying from 0.09 to 0.2, and laminated material on cotton base 0.03 to 0.07.

The points of chief interest to the works' engineer are that synthetic bearings are able to withstand the severest punishment under the most destructive conditions of overload, neglect and lack of lubrication, which play havoc with even the best metal bearings. They are also able to withstand sudden changes in temperature, possess the resiliency and strength to resist crushing loads, and are impervious to the action of most chemicals, oils, acids, solvents, reagents and other liquids.

Experience with plastic bearings has shown that although a number of different lubricants can be used with varying degrees of efficiency, the best is water. Adequate water cooling is essential because of the low thermal conductivity of the material, which if allowed to run dry too long will char.

The thermal conductivity of bearing metals varies from 45 kg.-cal. up to 100 kg.-cal. per metre per hour per degree Centigrade, and that of laminated-bearing material only 0.15 kg.-cal. to 0.20 kg.-cal. per metre per hour per degree Centrigrade. It should, however, be pointed out that even when the plastic bearing runs dry and chars, the shaft is not scored or damaged in the way as would be likely to happen if metal bearings were injured.

For numerous purposes in the American paper industry where lubrication is difficult because no lubricant other than water can be used, Micarta bearings manufactured by Westinghouse Electric are being increasingly specified. It will at once be realized that if metal bearings are used there is always a danger of the water gaining access and cutting the metal. On the other hand, if oil is employed, then it is liable to leak out and cause damage to paper or stock. The most important advantage of the laminated bearing for this purpose is, of course, its high resistance to wear. At one of the largest paper mills in the States, frequent failure of the bronze bearings on the bottom roll of a second press section caused the management to try out laminated bearings. They callipered the journals at the time the bearings were installed, and also at the end of six months' trouble-free service. There was no difference in the measurements, and on examination the bearings showed not the slightest sign of wear.



A pair of small Tufnol bearings.

A large moulded Tufnol liner with a third ring made by Ellison Insulations, Ltd., Perry Barr, Birmingham.

A strip type of Tufnol bearing in a metal case. The bearing consists of four segments.

One of the most interesting and important of the industrial applications of plastic bearings is in the steel rolling mill, where exceptionally severe conditions are maintained. Mr. Herbert W. Rowell, in a paper entitled "The Lubrication of Laminated Synthetic Resinoid Bearing Materials," read before the Institution of Mechanical Engineers, October 13, 1937, mentioned that in Germany over 80 per cent. of rolling mill bearings are made from laminated material. He ascribed the superior wearing qualities of the plastic bearing to the peculiar properties of the material, which enable it to hold a much heavier film of water lubricant than a metal can at a similar speed and high bearing pressure. "At first sight," said Mr. Rowell, "it seems absurd to use an efficient brake-shoe lining as a bearing surface.

When dry the material has a coefficient of friction equal to that of a good automobile brake lining. When lubricated with water, however, the coefficient of friction is much lower than that of metals lubricated with water, if test conditions are the same."

Tufnol, the well-known laminated material manufactured by Ellison Insulations, Ltd., Birmingham, has been used in English mills for some years now with great success. It has recently been disclosed that during tests in mills 3,000 tons of metal were rolled with bronze bearings and 104,000 tons with Tufnol. The bronze bearings were then found to be worn out, but the Tufnol ones were still good for many more tons. In works practice it has been found that whereas brass bearings last only 10 days, Tufnol is good for six months of hard use. The saving in power with synthetic bearings is authoritatively reported to be from 15 per cent. to 80 per cent.

Mr. H. V. Potter, Managing Director of Bakelite, Ltd., gave some interesting particulars in a paper read before the Institution of Mechanical Engineers, Sheffield, September 28, 1938: A British user states that with bronze bearings on a rolling mill it was the practice to renew them every six to eight weeks. A set of Bakelite resinoid laminated fabric bearings fitted to the same mill were not replaced until 20 months had elapsed, the conditions of service being the same throughout. Also, it was estimated that the savings in power consumption were approximately 25 per cent. to 30 per cent.

In Germany 80 per cent. of rolling mill bearings are of the phenolic resinoid type, and their life may be as much as 12 times longer than that of metal bearings (I.P.I. "Transactions," 1936-7, Vol. 6, No. 11, pp. 64-65). Report No. 136 of the Rolling Mills Committee of the Association of German Ironmasters gives an example of a rolling mill which when fitted with bronze bearings gave an average production of 2,400 tons, against 36.000 to 80,000 tons when fitted with a resinoid fabric bearing. This same report states that although the cost of bronze bearings was only 50 per cent. of the cost of the resinoid bearings, the bronze bearings worked out at 7½ times the cost of the fabric bearings owing to the greater durability of the latter.

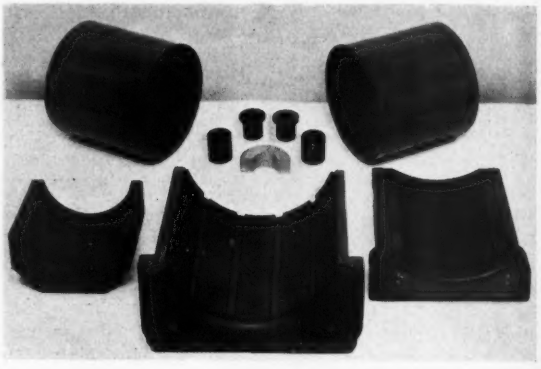
An American manufacturer of resinoid laminated bearings publishes a brochure on synthetic resin bearings, and quotes as an example the finishing stand of an 18-in. sheet bar mill which gave a production of 100,000 tons over a period of two years with synthetic resin bearings, as against 2,500 to 5,000 tons with previous bronze bearings.

Another American manufacturer states that their roll-neck bearings will give 20 to 40 times longer bearing life and 25 per cent. to 50 per cent. power savings.

In some Swedish rolling mills, bearings made from resinoid materials have been used successfully. These bearings are mainly of Continental manufacture, and some mills have installed the moulded type. One user states that paper base materials have been tried, but without success as they are apt to split. Bearings made from fabric base materials have given good life equal to several times that of the metal type, and the saving in power consumption being 25 per cent. to 40 per cent. One set of fabric bearings was fitted to the seventh pair of rolls in a wire mill in September, 1935, and in September, 1937, was reported to be still in good condition.

There appears to be a general opinion in favour of bearings made from resinoid materials both as regards life and power consumption. Other advantages which have been found are: the ability to work satisfactorily with water only as lubricant, cleaner operation, elimination of excessive peak loads, reduction in maintenance charges and cheaper operating costs, longer runs between shutdowns, cooler rolls, loading can be increased and heavier reductions made possible.

These materials can be applied to bearings in various forms. In some cases segmental liners are moulded to shape or cut from wound tube; in other cases blocks of laminated material are machined to shape or strips of laminated materials are dovetailed into grooves machined in an existing housing.



Examples of Bakelite bearings.

Roll Along, Plastics

AN interesting and novel use for the transparent or translucent type of urea-formaldehyde synthetic-resin materials has recently appeared on the market in the form of a roll front for powder compacts. As shown in the illustration, the moulded material is in the form of segments jointed together to form a pliable sliding top to the compact.

On sliding the top round the end of the compact a mirror is automatically exposed, and a spring cover to the puff and powder container flies open. After use, the cover is slid back into its original position, the powder container is again sealed and the mirror retracts into the case with the one movement.

The idea of a roll top in plastic material appears to open up a large and interesting field for development, as, apart from its uses as an attractive and neat sliding cover for fancy goods containers of all kinds, it is easy to visualize the production of roll tops for desks, filing cabinets, cash registers, and so on, up to the roll fronts for tobacconists' kiosks and shop fronts, where the attractive colours could be blended to match the present-day mode of chromium fittings.

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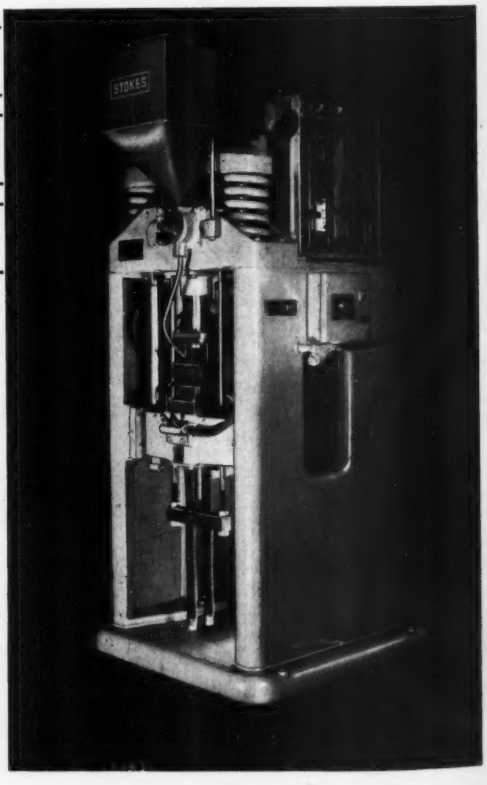

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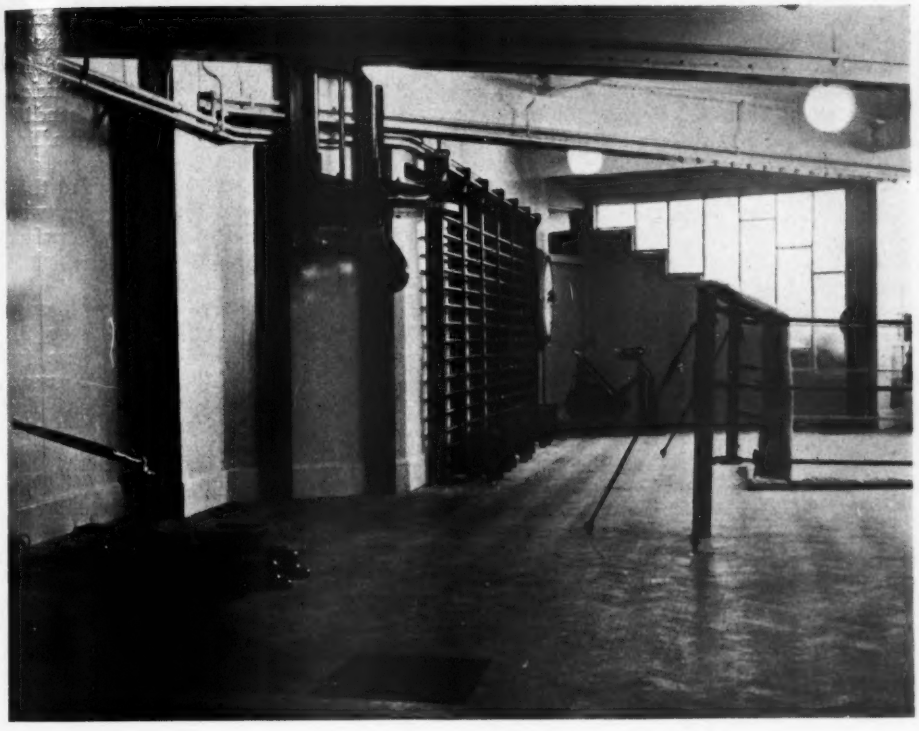


This is the type of gymnasium now being fitted up in hotels and schools.

PHYSICAL JERKS WITH PLASTICS

PUBLICITY for the "Keep Fit Movement" is making many young people conscious of the lasting benefits to health which can so easily be gained by regular exercise. For this reason the gymnasium, previously patronized by only a few diehards, now promises to become the centre of a great deal of activity during the next few years. Increased interest in, and patronage of, the gymnasium means better business for sports outfitters and manufacturers of those complicated machines so necessary for keeping youthful muscles supple and preventing or reducing middle-age spread.

In this country gymnasiums are to be found only in schools, colleges, health centres and some of the more exclusive hotels. In consequence, the sale of equipment is more restricted than in countries where athletic prowess is considered even more important than mental development. Not only are the gymnasiums in these countries elaborately furnished with the most scientifically designed gadgets calculated to increase chest measurement, biceps and, indeed, every other muscle, but there are infra-red and ultra-violet lamps placed at the disposal of patrons for special use.

The old type of gymnasium was built rather after the style of the swimming bath; that is, with walls of white glazed bricks, and it usually has a somewhat depressing effect on even the most exuberant spirits and is often cold and damp six months out of the twelve. The idea of making the Mecca of health less like a mortuary and more like a cheerfully decorated centre of amusement and exercise has, happily, been gaining strength for some time. Thus it is not unusual to provide either wood or plastic laminated walls. These not only look more pleasant than dazzling white bricks or grey distempered walls, but they prove more satisfactory in use as they help to keep the place at a more equable temperature throughout the year. Wood or laminated plastic sheets are often fixed to a blanket of some efficient sound-absorbing material, such as glass, silk or asbestos boards, etc., and these help very considerably to insulate the gymnasium.

It should not be forgotten that wood retains heat and therefore has a warm feel. Laminated sheeting is a very bad conductor of heat and so contributes to the insulation of the building. The important difference between wood and laminated sheet is that the latter does not warp or alter in shape in either winter or summer, and also affords better protection against the spread of fire than ordinary Gaboon plywood or similar wood. This does not mean that the plastic panelling is fireproof, but rather resistant to the immediate spread of fire, and its use tends to increase the safety of the building.

Another advantage shared by plastics is that the sheets are available in a number of bright and attractive colours, and if desired metal inlays can be obtained. A great future for this type of wall covering lies in the use of large paintings and photographs, impregnated with resin and pressed down on to the base so as to form an indestructible surface. It is a great wonder that architects and others responsible for the furnishing of health centres have not shown a good deal more interest in the use of these decorative wall surfaces. It needs no great effort of imagination to appreciate the immense propaganda value of large photographs of open-air scenes, athletic contests, etc., made up in sections and filling a large expanse of wall, similar to those shown in the Scottish Pavilion at the Empire Exhibition.

The floor of the gymnasium may be made of one of several widely different materials, such as rubber, cork or a composition stone over which is laid a fairly substantial rope matting or linoleum. The first-named is certainly the best from all angles, as it is resilient enough to form a safe landing place for athletes who fall off the horizontal bar, and by deadening sound makes the gymnasium a more restful and comfortable place. Another important point in favour of rubber is that it can be obtained in a non-slip variety which affords the maximum protection and reduces accidents. Every year polished wood flooring is responsible for a large number of sprained ankles and other leg troubles.

For increased resilience and improved sound absorption, a sponge-rubber flooring material is available, and this has a cushioning effect comparable with that of heavy carpet, but is, of course, far more hygienic.

Apart from the use of rubber in the gymnasium, there are many opportunities for moulded plastics and the market is quite considerable. According to a recent survey, there are 1,250 bona fide sports and games shops and the retail value of the goods is approximately £4,000,000 a year. Already plastics are used for moulding parts of health-ray lamps, and the Hanovia Co., Ltd., of Slough, have made generous use of moulded components.

Many excellent opportunities exist for the combined use of mouldings and die castings for parts of gymnastic appliances. They would combine maximum strength with smart appearance and have a surface that would resist wear and tear indefinitely. Another suggestion which is receiving a good deal of attention from manufacturers is to cover exposed parts of these appliances with cellulose-acetate tubing, similar to that used for the handrails and brackets, etc., of commercial vehicles. A thickness of acetate or nitrate material 15 thousandths of an inch thickness would stand up to rough handling indefinitely without showing any signs of abrasion, and prove a great deal more comfortable to the hand than any enamel. A point to realize in connection with plastics for these purposes is that they afford a surface that is never really cold in the same way as metal or wood.

In many different and frequently little-known ways plastics are making contributions to the "Keep Fit Movement," and one of the latest is their use for specially shaped inner soles for orthopædic footwear, so designed as to correct any defect in walking. The use of moulded zip-fasteners for sports garments is also becoming very popular, as they can be obtained in a number of bright colours which are really permanent.

The sports market is likely to be of increasing value to plastics, and it is predicted, says *The Manchester Guardian Commercial*, September 16, "that national fitness schemes are likely to develop more in the direction of physical training rather than specific sports activities." This means that gymnasiums will become increasingly popular and a considerable impetus given to the production of all accessories likely to increase physical fitness.

The Eclipse Razor Goes to Market—

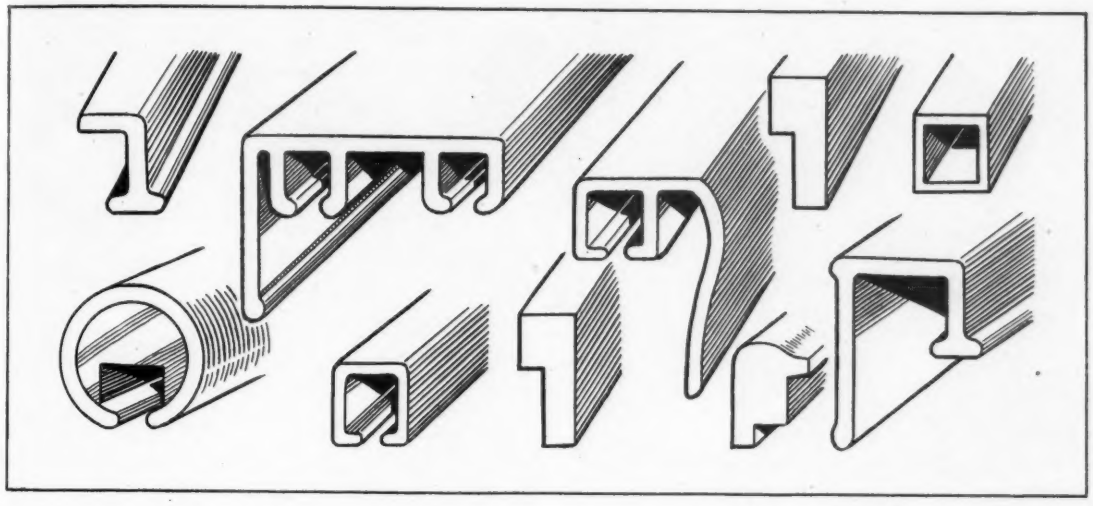
In New Moulded Container

MANUFACTURERS of safety razors have for some time now devoted considerable attention to the presentation of their products, as they realize that the response of the buying public is greatly determined by the attractiveness of the goods displayed. James Neill and Co., Ltd., of Sheffield, recently decided to modernize their well-known Eclipse Red Ring Razor case, and after a careful survey of all the available materials decided on plastics. They entrusted the moulding of the case to Healey Mouldings, Ltd., of Birmingham, who are to be congratulated on turning out such a fine piece of work. The top of the case is of ivory amino moulding powder, and the base of black Bakelite.

Both closed and open the new razor set looks equally smart.

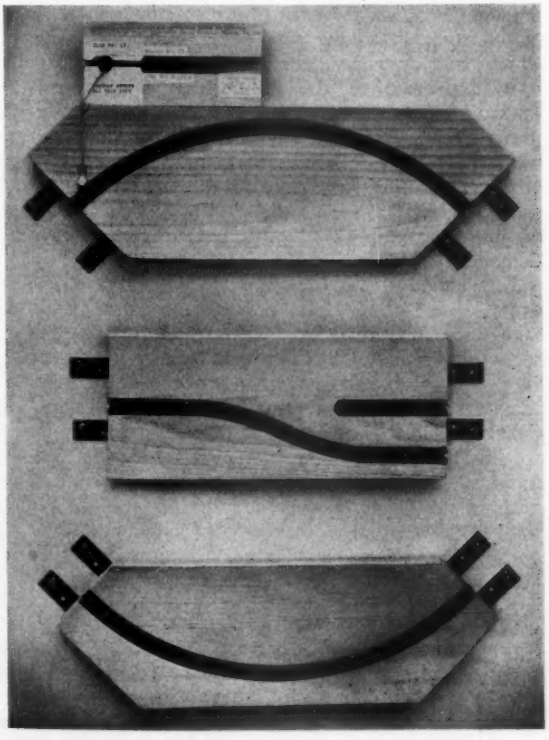
The container opens and shuts very easily and is of handy and compact dimensions.

Retailers who have handled the set agree that its original design makes a striking display for both shop windows and counters, and they are enthusiastic about its future sales ability. We consider that the new Eclipse plastic case compares very favourably with anything we have so far seen from the States, and the finish leaves nothing to be desired. There is no doubt that Healey Mouldings, Ltd., have every right to be proud of their new creation, and we shall look forward to further interesting work from this progressive firm.



EXTRUDED PLASTICS for the BUILDING TRADE

THE familiar curtain runway made of metal is undoubtedly a great advance over the old-fashioned wooden pole and brass rings, but at the recent Building Exhibition it was shown that it is by no means the last word in real window convenience. An entirely new type of runway made of extruded phenol formaldehyde resin is now being manufactured for the building trade by the Dap Manufacturing Co., and this new firm showed some of their latest products at the Olympia Exhibition.



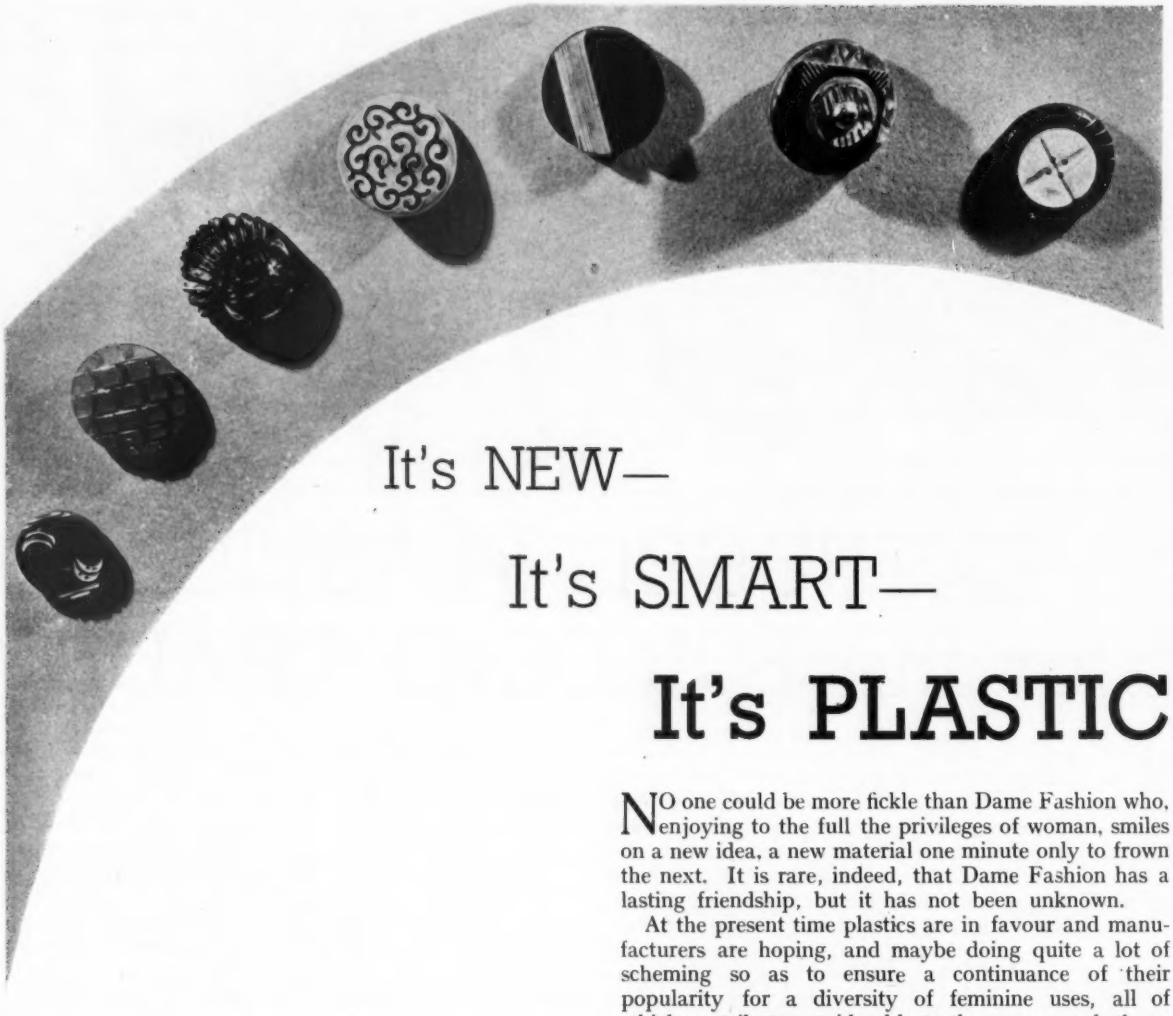
Examples of extruded curtain railing.

The chief advantages claimed by the new plastic runway are its complete freedom from corrosion, which ensures exceptionally easy running, noiseless working and attractive appearance. The fact that these extruded rods can be built into wood or plaster and so made completely invisible is considered by architects to be a great asset, especially as it does away with the necessity to have a pelmet, which is, of course, essential in the case of metal runways. The actual fixing of the rails invisibly into wood or plaster is quite straightforward and offers no difficulty to the experienced joiner. First of all the rail is cut to size with a fine hack-saw, then a groove is made in the woodwork of the window frame, according to the architect's specifications. This groove, which must fit the runway accurately, is then coated with a special glue, which is also used for coating the rail. The latter is then inserted into the groove and kept in position until adhesion is complete. Other simple precautions are recommended by the manufacturers, but the entire process is quite simple and quick to carry out.

Where it is not considered essential to install invisible rails, there are extruded pieces available for fixing with special brackets to the ceiling, and these are very neat in appearance. All extruded sections can be obtained in black and a wide range of attractive colours. Walnut, oak and other wood shades are popular because they harmonize with most colour schemes.

An interesting and important feature of these extruded sections is that they are available in a number of different designs, shapes and lengths—indeed, there is no limit to the length of section. This means that runways can be fixed with the minimum of joints and used for the most awkward window spaces.

As regards strength, these plastic runways fulfil all practical requirements. The ultimate tensile strength of the Rockite resin, which is the material used for their manufacture, is not less than 5,000 lb. per sq. in., and the impact strength 0.11 ft.-lb. to 0.13 ft.-lb.



It's NEW—

It's SMART—

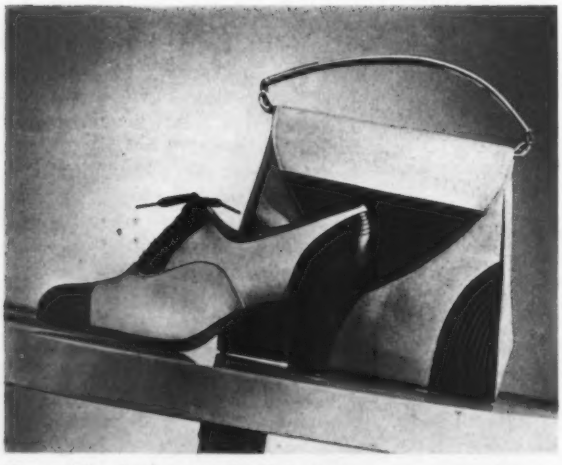
It's PLASTIC

NO one could be more fickle than Dame Fashion who, enjoying to the full the privileges of woman, smiles on a new idea, a new material one minute only to frown the next. It is rare, indeed, that Dame Fashion has a lasting friendship, but it has not been unknown.

At the present time plastics are in favour and manufacturers are hoping, and maybe doing quite a lot of scheming so as to ensure a continuance of their popularity for a diversity of feminine uses, all of which contribute considerably to the success and, therefore, expansion of the industry. Apart from the immediate benefit resulting from Dame Fashion's preference, it is realized that when women begin to wear plastic hats, jewellery, or buy plastic dressing-table accessories, and make-up sets, then excellent publicity is given which all helps to increase the scope of plastics and eventually encourages a healthy demand.

Hats made almost entirely of clear opaque cellulose acetate sheet material are now all the vogue in Miami and other pleasure resorts of the United States. They set a new style and one which is in perfect keeping with the latest tendencies in dress and, moreover, they are by no means as fragile as they look and retain their shape, colour and smart appearance as long as any woman desires. The fashioning of the hats by the milliner represents no great difficulty because cellulose acetate is naturally a very adaptable material. It can be cut with a pair of scissors, sewn with needle and cotton in the usual way, stuck down with a suitable adhesive, and, of course, bent to any desired shape.

Switching from hats to shoes is quite natural for any well-dressed woman whose critical eye always seems to subject these to an unusually severe examination. The modern shoe owes a great deal of its stylish and clean-cut appearance to plastics. Apart from the use of special compound fabrics containing plastics in one form or another, there are moulded eyelets or metal eyelets

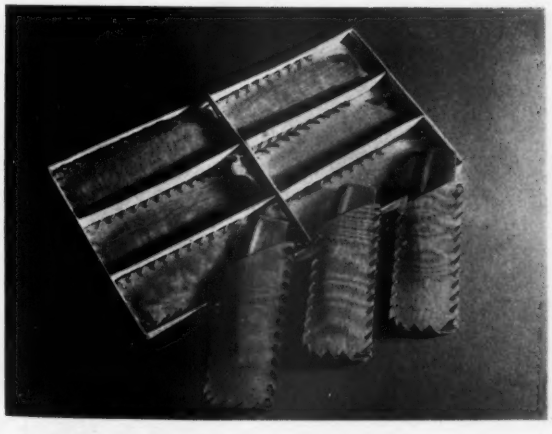


The scuffless heel made of cellulose nitrate plastic, which has for several seasons now filled an important place in the field of better footwear, marks a style advance this season in new grains and colours. This tailored-tie model is carried out in natural linen with rich, deep Italian tan calf trim.

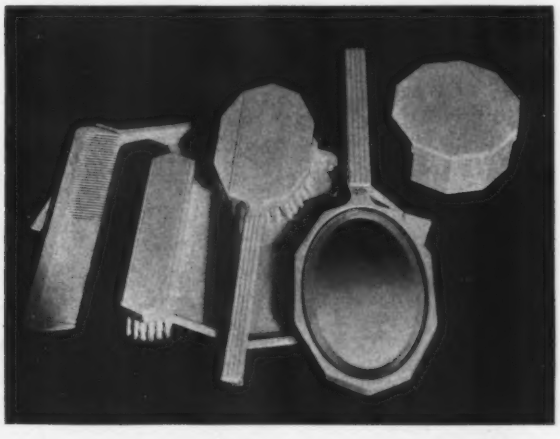
Two American styles, designed by Louisesanders, which owe their origin to the clever use of transparent and opaque cellulose acetate sheet, made by Du Pont and marketed under the name of Plastacele.

covered with cellulose acetate, and all kinds of lacquered braids, tapes, laces and similar material for the manufacture of shoes for summer wear. One of the latest developments in the shoe trade is the scuffless heel made by giving the wooden shape a thick coating of specially tough celluloid, which dries with an attractive grain to match other parts of the shoe. This celluloid surface is far tougher and better able to withstand abrasion than the thin coat of leather previously used for surfacing the heel, and in appearance it certainly does give perfect satisfaction.

What about dress itself? Here, again, plastics play an important, although, except for jewellery, buttons and buckles, not, perhaps, a very obvious part. First of all, there is the use of synthetic resin for the manufacture of non-creasing fabrics, of which hundreds of miles are being made every year in this country. Then there is the plastic zip-fastener which is rapidly currying



Bexoid case fitted with pocket combs



Buckingham toilet ware made of Xylonite by British Xylonite, Ltd.

favour because it is available in a wide range of colours and so makes the dress designer's work a trifle less arduous. Incidentally, the introduction of the moulded zip-fastener encouraged fashion experts to use zips for decorative as well as purely utilitarian purposes, and thus a new page was written in 1938 fashions.

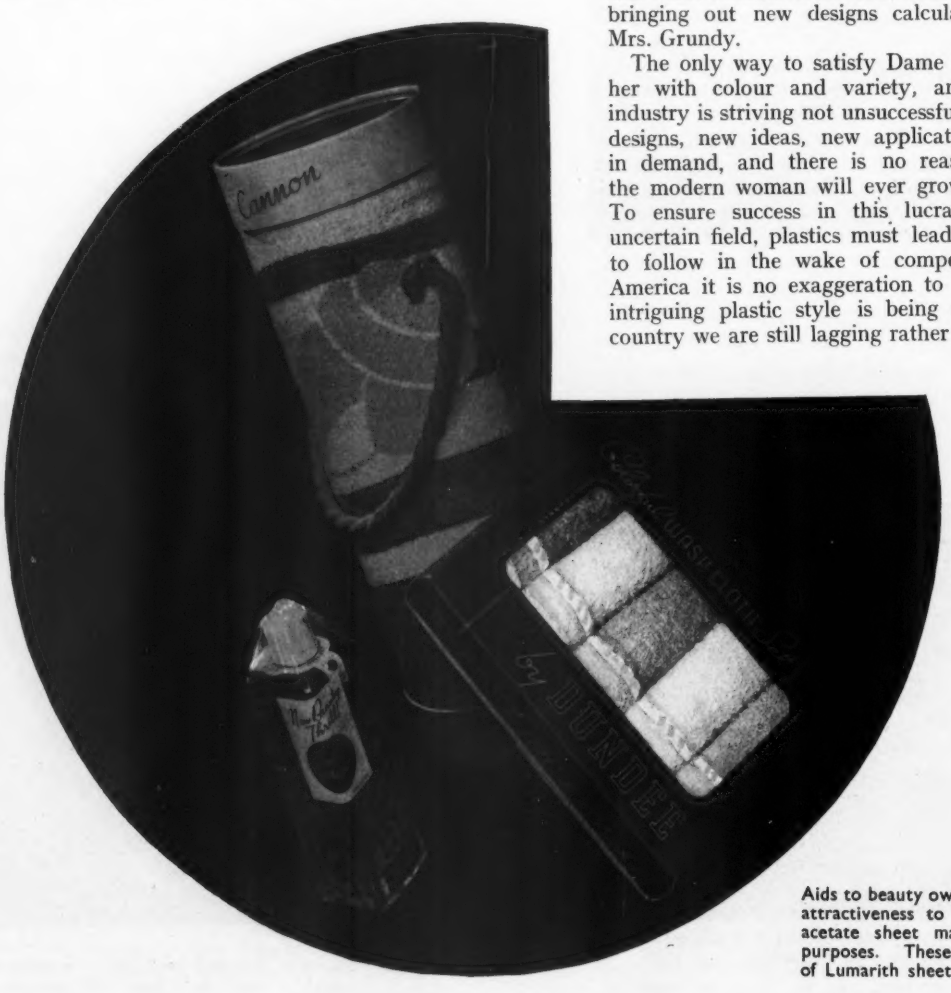
Buttons, buckles, clasps and jewellery for every occasion. Yes! these owe their origin to plastics, particularly Erinoid and the cast resins such as Catalin. Other materials are also being used and some very attractive decorative hair combs are now being made of glass-clear polystyrol resins. With the wealth of colour now available in plastics there is no possible excuse for any woman lacking that last finishing touch in the way of a sparkling buckle to a belt, a brilliantly coloured brooch or a neat row of unusually shaped buttons. These accessories, which have such a great influence on present-day clothes, are available in a most catholic range of styles and colours.

Not only do plastics influence women's dress, but they transform her dressing-table from being the repository of a lot of nondescript bottles and jars to one rich in colour and a focal point of pleasant interest. There is no doubt that moulders are directly responsible for the modern woman spending a good deal more of her time at the dressing table, but they shoulder this responsibility very lightly because it means good business. The cosmetic trade is of the greatest benefit to the plastics industry, and no cosmetic or toilet goods manufacturer can possibly ignore the popularity of plastics.

Examples of new dress accessories made of Catalin.

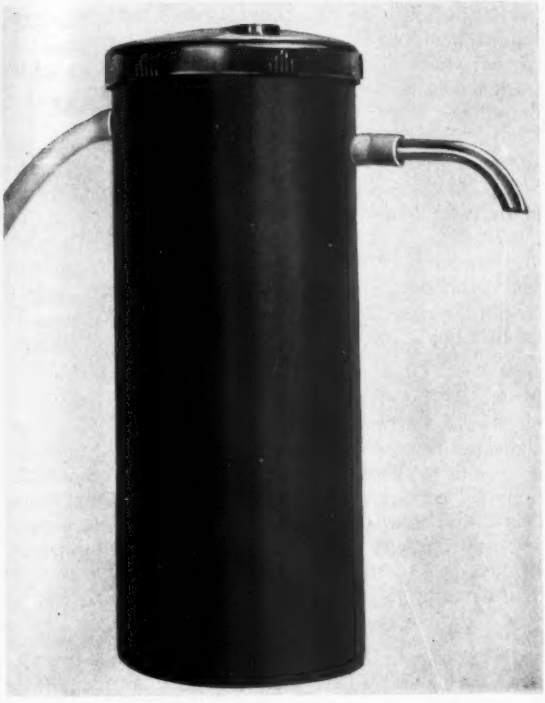
Apart, however, from the use of phenol formaldehyde and amino moulding powders for making bottle caps and containers, and also the growing interest now being taken in such materials as Diakon, plastics find an important application in the fabrication of hairbrush sets. The British Xylonite Co., Ltd., have for many years now been responsible for some of the smartest and most reliable toilet sets, and they are continually bringing out new designs calculated to tempt even Mrs. Grundy.

The only way to satisfy Dame Fashion is to dazzle her with colour and variety, and this the plastics industry is striving not unsuccessfully to achieve. New designs, new ideas, new applications are continually in demand, and there is no reason to suppose that the modern woman will ever grow tired of a change. To ensure success in this lucrative, but somewhat uncertain field, plastics must lead and not be content to follow in the wake of competitive material. In America it is no exaggeration to say that a new and intriguing plastic style is being created, but in this country we are still lagging rather too far behind.



Aids to beauty owe a great deal of their attractiveness to the use of cellulose acetate sheet material for packaging purposes. These examples make use of Lumarith sheets.

The All-moulded Water Softener—



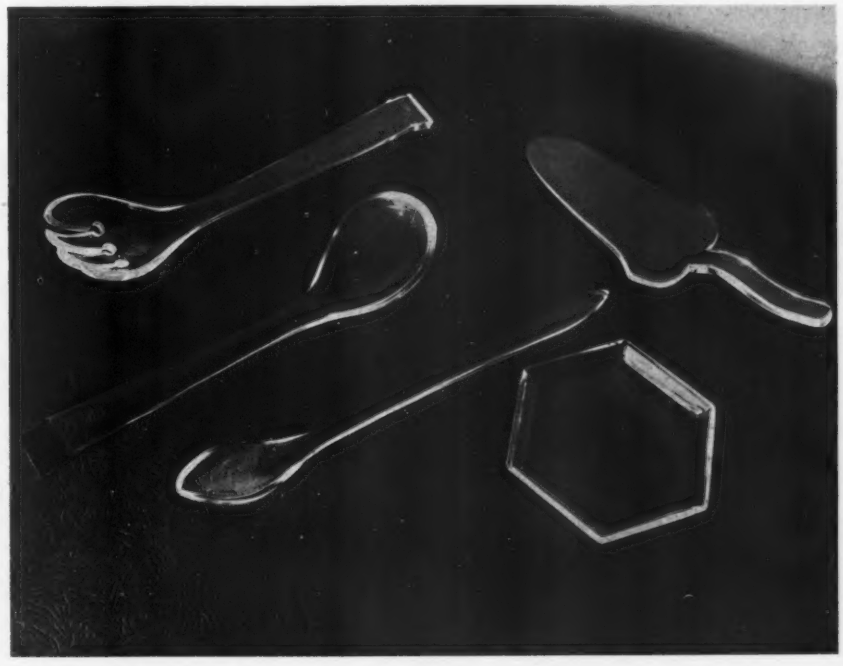
Bakelite Creates New and Promising Market

AN excellent acid resistance, freedom from warping under humid conditions and ease of moulding are the outstanding characteristics of a new Bakelite moulding material which has recently been developed. All of these qualities are necessary factors in the success of the all-moulded "Sussex" water softener. The main container, where the softening medium is housed, will constantly be filled with water, the temperature of which may vary rapidly from boiling to quite cold. The mouldings produced from the new material (X.5448/1) remain unaffected by even these arduous conditions.

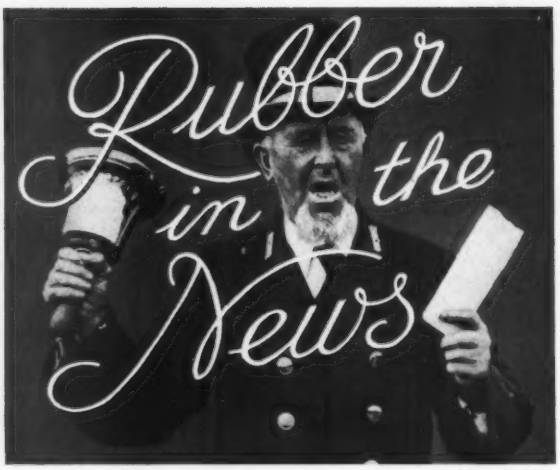
The advantages of a moulded container are that it is impossible for it to corrode, there is no plating to peel off, and it has a permanent lustrous finish. The model shown, which sells at the extremely low price of 30s., operates on the base-exchange method and has a capacity of 100 gallons. It is finished in black, the top lid being easily removable for replenishing the softening medium. The screw thread for this lid and the threads for the bushes were all formed simultaneously with the production of the container in a single moulding operation by Insulators, Ltd., who are to be congratulated on the success of their efforts.

German Design and Workmanship

These dainty little pieces of tableware made of Plexiglas are now being sold in Germany in place of similar cutlery made of metal and horn. Personally we like them, not only because of their clean and hygienic appearance, but because of their well-planned and eminently sensible design. They have a deceptive appearance of fragility owing to their glasslike appearance, and this to many housewives is rather intriguing. In the ordinary rough and tumble of domestic life these table accessories can be relied upon to give every satisfaction, as Plexiglas, like the other methylmethacrylate resins, such as Perspex, is extraordinarily tough and durable. We understand that goods similar to those illustrated sell well in Germany and Hungary.



Transparency in all things always has a beauty of its own and moreover it can justly claim to be very popular with housewives. These sensibly designed pieces of tableware made of Plexiglas by Rohm and Haas are stealing a good deal of cut glass' thunder and creating a new and indeed very profitable market for plastics.



★

According to *The Times*, September 2, 1938, French and Catalan engineers have experimented successfully with rubber bridges over the Ebro, in Government Spain. These bridges can, apparently, be rolled up in the event of aerial attack by Nationalist bombers.

★

Elastic compound fabrics are now receiving a good deal of attention by textile manufacturers. A recent patent, B.P. 486,215, describes a new method of production. An incompletely vulcanized rubber sheet is united by an adhesive, such as rubber cement, to an elastic fabric, and the composite sheet run through a pair of rollers. The roller which contacts with the rubber is equipped with a number of tapering puncturing points, and the other is covered with paper. The adjustment of the two rollers is such that the points barely pass through the rubber. The vulcanization of the rubber is then completed. The patent states that an open loosely knit or woven fabric may be cemented to the other side of the rubber layer before puncturing.

★

Porous rubber sheets suitable for bandages may be made (according to B.P. 486,641) by spraying a latex composition containing vulcanizing ingredients and non-volatile stabilizers on to a heated deposition surface, which may be of knitted or woven fabric; or the latex may be sprayed alternatively with a coagulant. The fabric may be stretched on a heated drum, and the latex sprayed during a number of revolutions. The sheet is then removed and vulcanized.

★

The noise-deadening properties of many highly resilient rubber floors are coming in for some criticism from bankers, who say that cashiers, if they are immersed in their work, cannot hear customers approach the counter, and when they look up and see a man facing them through the grille it gives them a shock. Apparently this can become so troublesome as to affect the health of nervous employees, and the dead silent floor also helps the bank-smasher. To overcome this difficulty some flooring firms are considering the advisability of making rubber composition floors that will have many of the desirable properties of the all-rubber floor and yet not be completely silent.

★

According to *The Rubber Age*, August, 1938, a new and improved Flexite acid bucket, which provides greater safety for workmen who handle corrosive liquids, has been introduced by the B. F. Goodrich Co., Akron, Ohio. The reinforced area of the base of the bucket has not only been enlarged but recessed to permit the worker to get a firm hold with his gloved hands. When the bucket is filled to capacity the liquid is still 2 ins. from the top, thus providing a needed safety margin. Graduated marks also enable the user to measure quantities accurately. Flexite buckets are available in the 3-gallon size only, weigh 3½ lb. each, and are furnished with steel or metal reinforced hard rubber handles. Flexite dippers are also available in 1-quart and 2-quart sizes, and their use is recommended as an added protection against splashing and spilling.

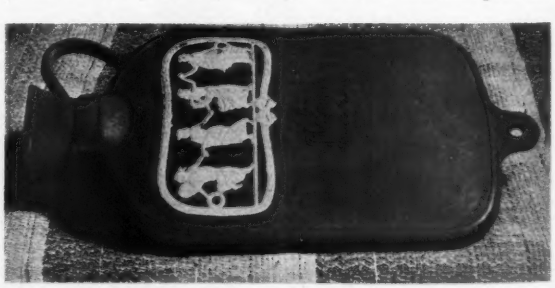
★

Samson Safe-Flex rubber-bladed fans, first marketed in U.S.A., are now on sale in this country. The chief claim made for them is that they are accident-proof—their rubber blades are so soft and pliable that they will not injure even a baby's fingers. In addition, it is stated that they are highly efficient in the volume of breeze they deliver, and are unusually quiet in action. Electrical Commodities, Ltd., Wembley, are the manufacturers.

★

The seamless moulded hot-water bottle was invented by Mr. T. W. Miller, founder and chairman of the Faultless Rubber Co., of Ashland, U.S.A., in November, 1905. When the Miller hot-water bottle was placed on the market it met with a great deal of resistance from the drug sundries trade, but eventually this opposition was broken down and the moulded rubber hot-water bottle began to become popular. The Reliance Rubber Co., Ltd., of Cremorne Works, Lots Road, Chelsea, London, were the first to import the moulded hot-water bottle into this country, and the company faced a long and uphill battle before it was accepted. After a few years of merchanting the American hot-water bottle the Reliance Rubber Co., Ltd., started to manufacture for themselves, and from the first made an exceptionally good article on the experience of the earlier manufacturer.

Considerable progress has been made since those early years of the present century, and the British pioneer

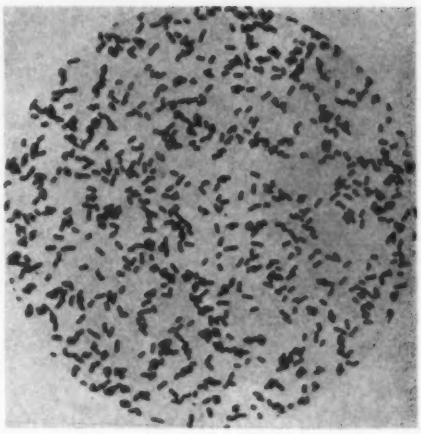


The "Flaxman" hot-water bottle made by the Reliance Rubber Co., Ltd.

company have always been well abreast in new developments. Their latest line, known as the "Flaxman" moulded seamless hot-water bottle, retail price 5s. 11d., reveals an exceptionally high degree of artistry and skill in manufacture. The bottle itself is in Wedgwood blue, and the design of the Four Graces in relief in white rubber.

THE BIGGER WAR

Left: Termites or white ants; workers, soldiers, etc. (×1½).



Right: Typical microbes. B. Typhosus (×900).

There appears ample indication that synthetic resins should prove, and in some instances have proved, excellent materials for the protection of wood against fungi and insects. The following notes give some details of the problems involved and of the materials normally used.

MR. H. G. WELLS was the first, we presume, to dramatize the eternal war between man and low life. It was only some 75 years ago that Pasteur, the great French chemist, showed an unbelieving audience that there was an invisible world of bacteria against which we must fight to prevent rot and disease.

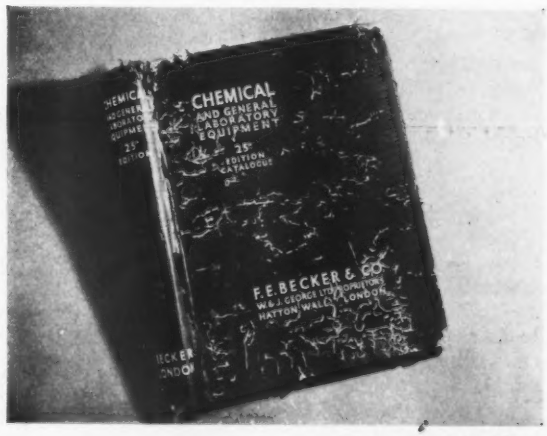
The story of man's fight against insect, fungus and bacterium is fascinating enough to read, but it is not sufficient merely to read, to enjoy, and then to forget, for the fight is urgent and must be continuous.

And it is the most arduous fight of all, since we are so poorly equipped for it. We can easily slaughter our fellow-beings, for man is a good-sized target. We can easily rid the world of whales, seals, elephants and tigers, and, indeed, the first two have been nearly wiped out of existence, for, discounting some slight danger in the attempt, they are relatively simple to kill with harpoon and gun. It is when we try to hit animals or life much smaller than ourselves that we do not seem to be so successful. It also happens that small life is not only small, but fantastically numerous, which greatly adds to the difficulty of fighting.

But organization can do, and is doing, a great deal. The discovery that carbolic acid is an excellent germicide put a potent weapon in the hands of the medical profession in its fight against disease-producing bacteria. This led the way to the discovery of thousands of chemicals which help to keep us healthy or to cure our ills. But the medical profession has been successful only because it is based on scientific knowledge and because it is so well organized. In many other branches of life little organized effort has been made, or is of such recent origin that the full effect is not yet felt. We have, for example, little to congratulate ourselves in our fight against the locust or the white ant. In some instances even organized effort has little effect owing to our paucity of weapons; for example, certain viruses are so small that science cannot examine them with modern instruments.

Outside the medical profession a fair control is kept on many dangerous organisms. Drinking water is filtered and rigidly protected against certain organisms, the grape-vine is protected against the dreaded phylloxera by means of copper solutions, trees are sprayed to prevent destruction by insects and flowers by many diseases. On the other hand, all bacteria are not harmful. In many branches of industry there are beneficent bacteria and other organisms which are controlled by man to produce foods and chemicals. The production of vinegar, of cheese, of alcohol and many chemicals are examples of these.

Among the most important of the wars that humanity wages is that which is carried on for the protection of wood against insects, fungi and other low life. The story of this fight is not always one of success, for it has often been carried on in a very half-hearted way, the reason being that in the past wood has been so abundant and relatively cheap. But all wood is attacked by insects and fungus growth; some more than others, but the general truth remains. Wood is



The work of the book-worm in the tropics.

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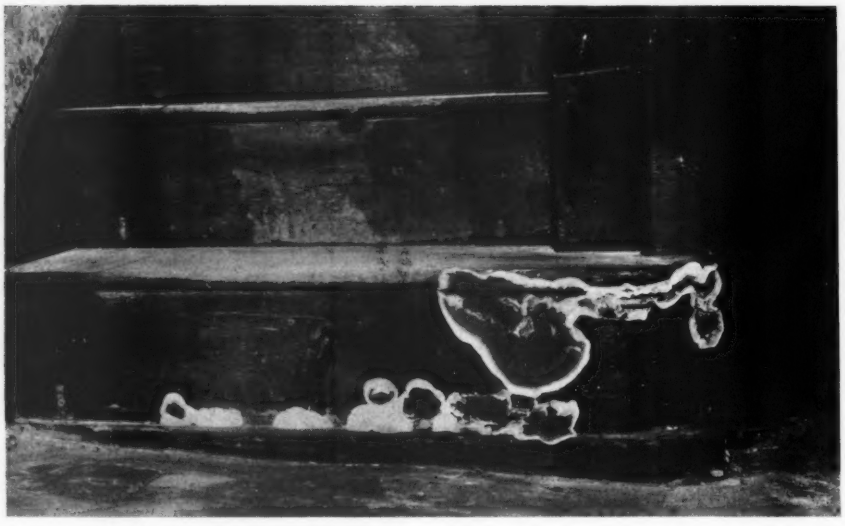

Fungus attack at foot of staircase in a house exposed to damp.

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gradually destroyed or weakened wherever it is not protected under ordinary conditions in the air and under water.

Dry rot brought about by the attack of fungus is present in almost every house and every church where moisture is able to enter wood. The Furniture Beetle which bores tiny holes is prevalent throughout the country, and the Death Watch Beetle, the larvæ of which bores holes much larger than the Furniture Beetle, lays its eggs in almost all woods, but prefers oak. Very recently it was reported that a church in the South of England was in danger of collapse through this cause. The total damage done by these insects and fungi in this country alone must be very large.

It recently came to the knowledge of the writer that a shipbuilding firm in West Canada which imports its wood from the eastern states has to employ a small army of men to remove fungus from the surface of the timber when it arrives, by hard brushes. This treatment has to be repeated at intervals while the material is in store.

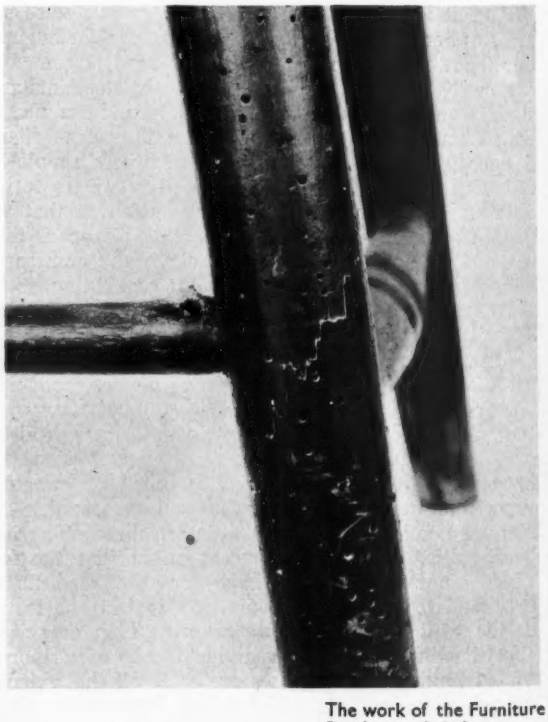
As for the white ant, which fortunately does not inhabit this country, the world-spread damage is incalculable. In the U.S.A. alone the destruction has been estimated at some $5,000,000 per week! Similar ravages have destroyed much valuable property in our tropical Dominions and Colonies. We note that part of a Government house in the Colonies collapsed through attack by these insects.

The methods of treating wood to prevent damage are generally the same. It is impregnated with a liquid which is poisonous to the destroying agency itself, or is one that renders the food of that agency, wood, etc., unpalatable.

The best known of these poisons, and which has been used for many years with success, is creosote. It is almost universally used for treating railway sleepers, fencing and the like. It is excellent against attack by many insects and fungi, but is far from ideal. It gradually loses its power if merely painted on the surface, it cannot be used for valuable timber owing to its colour and odour, it is not clean to handle, and cannot be painted. Moreover, it renders wood rather more inflammable.

Many solutions of poisons in water have been suggested and, indeed, are employed with considerable success. Some contain arsenic, mercury, copper or chromium salts, the arsenic solutions being not only useful against fungi, but also against the white ant. All these, too, have their drawbacks, since they are also, with the exception of the copper salts, poisonous to human beings. Since they are soluble in water, they can also be washed out by rain or water generally.

Other extremely useful materials are certain hard resin-like and water insoluble materials obtained by the union of metals with a petroleum acid called naphthenic acid. Copper naphthenate is one of the most important, resembling closely in the solid state a green resin. It is highly toxic to both fungi and insects, and is non-toxic to man. The most important attribute is that it can be dissolved in petrol or kerosene to give a thin solution which readily impregnates wood, entering the cells thereof. The petrol evaporates, leaving



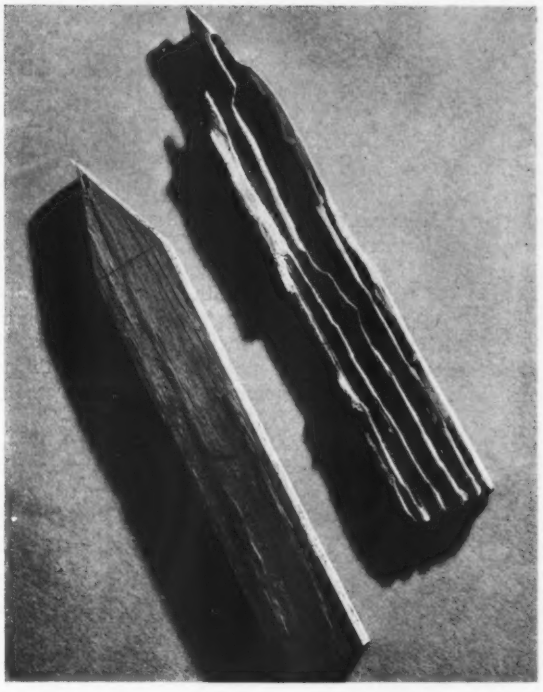
The work of the Furniture Beetle on chair-leg.

the solid resin behind and thus protecting the wood against attack. It is important to note that the copper naphthenate is almost insoluble in water, and is quite non-volatile. This material is especially widely employed in Denmark and in many tropical countries. There is, moreover, now strong evidence that the white ant, which is actually neither white nor an ant, but a type of roach, will not attack wood impregnated with it. The accompanying photograph shows two pieces of wood, one untreated and the other treated with copper naphthenate which has been received from Nigeria, where they were placed together near white ant-infested ground. The untreated piece has nearly been eaten away after a few weeks. In such tropical countries it is not uncommon for heavy untreated railway sleepers to be destroyed in the space of a month or so.

The use of synthetic resins of the phenol-formaldehyde type has not yet been considered to any extent for such purposes. The most noteworthy progress as a means of anti-insect construction was discussed in the pages of our July, 1938, issue, where laminated sheet was used as a means of building up a transportable air-conditioned room destined for the tropics. Such a building would be quite fungus and white ant-proof.

Synthetic resin in solution as a means of impregnating wood for such purposes has not, within our knowledge, been widely employed. Yet it would appear to have important possibilities.

The synthetic resin is itself quite inactive, and any free phenol which would be poisonous to insects is completely absent as such in a well-cured material. However, if wood were thoroughly impregnated with a solution so that the fibres and cells to a considerable depth were coated with a hard, tough resin, there is little doubt that its waterproof qualities would eliminate fungus growth. This has already proved to be the case with plywood in which synthetic resins have been used as glues. It is also highly probable that such treatment would be effective against the white ant. The sole food of this insect is wood or any cellulose material; or, rather, the digestive tract of the white ant contains a parasite which is capable of converting the wood into food for the insect. If, then, the wood were thoroughly impregnated with synthetic resin there is little doubt that the parasite could not perform its function and the ant would die. The suggestion that suitable poisons be admixed with the resin may also be entertained.



Treated and untreated wood exposed to termites.

This air-conditioned portable chamber for use in tropical climates for invalids, etc., was exhibited at the London School of Hygiene and Tropical Medicine in July last. The panels were of Bakelite laminated, which ensured the structure against attack by white ants and rot.

Ideas—

By the EDITOR

Borrowing From the Past

It has been said that the industrial designer need never go farther than the British Museum to get all the ideas he might want. It has also been said that the past is sufficiently full of beauty to fill the future. So true is this that the cynic has argued that the artist need create no more. There is thus a rich field in the past that might readily be uncovered to add to the beauty in the world, one in which the plastics industry might dig.

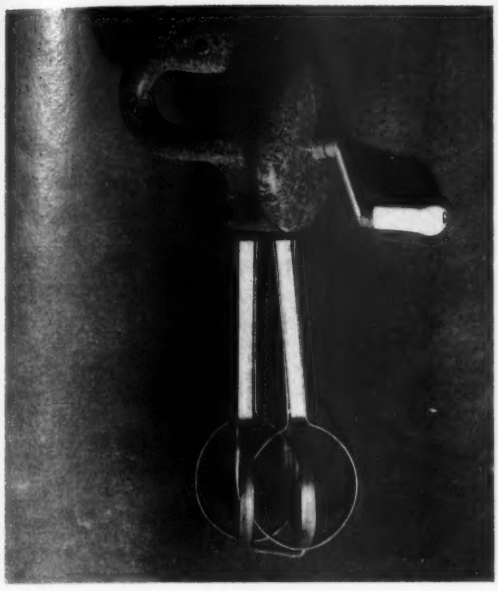
Lanarkite, Ltd., of Newarthill, have already dug with advantage, for they have reproduced in plastics a quaich, a Scottish drinking vessel of the 16th century. The form is exceedingly pleasing, and since it has been moulded from Scarab of a translucent pale green hue is of singular beauty. I saw this quaich at the Empire Exhibition in Scotland, and am using it as a sugar bowl. It can be used as an ashtray or even as a quaich!

Perfume and a Dash

Wandering around the Chemists' Exhibition the other day with a roving eye and a voracious hand, I picked up a fascinating example of how modern ingenuity and plastics can help in promoting sales. It was on the stand of Delavelle, of London, and took the form of a miniature scent bottle shaped to represent a soda siphon. The head—the part that is usually of metal in a full-sized siphon—was tiny but perfectly formed and moulded of amino resin. The representative on the stand knew not who moulded it, but I hand them my congratulations just the same. Congratulations, too, to Delavelle's, who market the new idea and put a dash in sales. The photograph in the opposite column is about full size.

Tobacco Containers

Last month I mentioned that Mr. F. Taylor, of Welwyn Garden City, presented me with an excellent idea for a moulded container to hold a dozen ready-made rolls of tobacco that are now so widely used. I pointed out that the smokers who smoke these, poor fellows, have no reasonable method of carrying them about. The ordinary tobacco pouch is useless, and the cardboard containers in which they are bought are very unsatisfactory. Mr. Taylor has now gone a step farther and has sent along a plan and elevation of the box he would like to see on the market. As will be seen from the accompanying illustration, his idea is readily mouldable. After this it would be churlish if the tobacco companies did not "come across" and do the handsome thing. The recesses need not be connected as shown.



Can You Beat It?

Truly plastics are making a stir in many departments of life. Here is an excellent egg-beater or whisk with the holder made of a green-coloured synthetic resin and moulded by Precision Plastics, Ltd., of Newhall Street, Birmingham, on behalf of the licensees. It is interesting to note that the beater has been designed so that the gear mechanism is entirely enclosed. As will be realized, the moulding has been made in two close-fitting halves, which are held together by screws, the whole apparatus thus being extremely robust. The enclosed design is especially commendable, for it eliminates the cleaning that is always necessary with the exposed-gear type.

Flowery Apology

A good many months ago I urged the manufacture of moulded flower pots, expatiated on their manifold advantages and even gave a drawing of the type I thought would be very suitable. Imagine my delight (and my horror) on finding my idea was by no means terribly original. It had already been done by

Mr. J. S. Peress when he was with Synplas, Ltd., as long ago as 1934 or 1935. I have just got one from a shop in Holborn. Herewith my late congratulations.

Perfume Containers

The cosmetic and perfumery industry, in view of its very nature in appealing to womankind, appears very ready to adopt novel ideas which are effective in promoting sales. Especially are they effective when the object is small and a replica of a larger object. This is true in the example of the Delavelle soda siphon shown on the first page of Ideas. Just before going to press we were presented with five moulded containers which Crystalate, Ltd., have manufactured for well-known perfume manufacturers. The piano, attaché-case and handbag are all perfumery bottle containers *in petto* and are not only very attractive but admirably moulded.

These ingeniously designed perfume bottle containers have been manufactured by Crystalate Ltd., for well-known perfume factors.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

NOTES AND COMMENTS

Solvents and the Plastic Industry

SOLVENTS take no part in the ordinary technique of pressure moulding, yet most moulding factories handle them in the spraying booths when lacquering is an adjunct to a moulding job. Some moulders, especially those who produce electrical and abrasive goods, have specialized in resin-bound cores made by impregnating metal and other powders with resin solution and subsequent stoving. Almost all manufacturers of resin employ them for the production of laminated goods and for the manufacture of synthetic resins suitably modified for the paint and varnish industry.

In the production of celluloid and other cellulose compounds they are widely used, and also enter both as solvents and as plasticizing agents in the working up of these and other compounds, such as polyvinyl resins and chlorinated and synthetic rubber. By far the greatest use is made of them in the nitrocellulose lacquer industry and the paint and varnish industry itself. The first named employs a bewildering number of them.

"The Technology of Solvents," by Dr. Otto Jordan, has just been published and should be welcomed by the whole plastics industry, not only because the author, a famous German chemist, is a world-renowned authority on this subject, but because the book has been so excellently devised and is so complete. The book has been translated in a very worthy manner by Mr. Alan Whitehead. The opening chapter deals with the mechanism of solution in a simple and clear manner which is especially welcome. Chapter III deals with diluents and the selection of solvents for special purposes, and Chapter IV with solvents for natural and synthetic resins, rubber and chlorinated rubber. A very useful section is devoted to inflammability and precautions to be taken with solvents and the means of storage.

This book is thoroughly recommended to chemist, works manager and administrator alike. It is published by Leonard Hill, Ltd., at 25s.

Heat-resistant Materials

In the testing of ashtray moulding material a drastic test is conducted by Bakelite, Ltd. Specimen mouldings are produced from the material, and a red-hot steel ball is placed on the moulding. Subjected to such a test a normal moulding material will be very badly blistered, but the heat-resistant properties of Bakelite material X.5427 ensure that any blisters formed are quite small. It has been found quite impossible to blister the material with burning cigarettes, and it is, therefore, particularly suitable for ashtrays.

Most heat-resistant mouldings can be satisfactorily produced from one of four grades of Bakelite material. Of these materials, X.5435, X.261 and X.5072 are of the short-fibred type, and may be moulded in much the same way as standard wood-filled powders, while a further advantage of the fourth material, X.250 long fibre, is its good mechanical strength. After heating at 400 degrees C., in accordance with B.S.S. 771, its crushing strength is still 2,240 lb. Type X.5435 is a relatively recent development possessing a high blister temperature, enabling it to rank among the best of Bakelite heat-resistant materials.

Petroleum as a Plastics Raw Material

In the August issue of *Industrial and Engineering Chemistry*, Mr. Perk Frolich, of the Standard Oil Co., New Jersey, U.S.A., gives a useful summary of the many resins and plastic materials which are being made commercially from petroleum products:—

1. Cracking-coil tar resins by condensation of highly condensed petroleum hydrocarbons such as those which are present in the tar bottoms from the cracking operation, with formaldehyde or sulphuric acid.
2. "Santoresin" by reaction of olefins and diolefins in the presence of aluminium chloride.
3. "Vistanex" by polymerization of unsaturated gaseous hydrocarbons to give compounds ranging in consistency from that of a viscous oil to rubbery materials having a molecular weight as high as 300,000.
4. Cellulose acetate by reaction of cellulose with acetic anhydride, which may be derived from ketene obtained by thermal decomposition of acetone produced by dehydrogenation of isopropyl alcohol.
5. Ethyl cellulose produced by reaction of cellulose with ethyl chloride or diethyl sulphate produced from ethylene.
6. Phenol-formaldehyde resins by condensation of formaldehyde with phenols.
7. Alkyd resins by reaction of dibasic acids with polyhydric alcohols.
8. Polysulphones by reaction of unsaturates with sulphur dioxide under conditions favouring the formation of high molecular weight products.
9. "Thiokol" by condensation of sodium polysulphide with ethylene dichloride or other chlorine containing derivatives.
10. "Neoprene" rubber by polymerization of chloroprene derived from acetylene.
11. "Buna" rubber by polymerization of butadiene.

THREE FAIRS

IN truth the Fair season is upon us. The past month saw three important ones—the Chemists' Exhibition at the Albert Hall, and the Building and Hairdressers' Exhibitions, both at Olympia, although in different buildings. Unfortunately, the European crisis interfered greatly with attendances at all of them. With the improvement in the situation attendances improved greatly.

The drug and pharmaceutical industry is, perhaps, one of the most important customers of the plastics industry, especially that portion of it which deals with containers, bottle stoppers and screw caps. The metal cap has almost disappeared in this industry, for not only is painting or spraying with colour eliminated, but corrosion generally no longer occurs. This is extremely important, since corrosion not only gives an unsightly appearance to a pack, but is also often responsible for colouring its contents. For those who cared to view the amazing variety of containers and caps that are available in plastics in all shapes and beautiful colours, the stand of United Glass Bottle Manufacturers, Ltd., was eminently satisfying.

At this exhibition we especially sought out the stand of William Gardner and Sons (Gloucester), Ltd., for this company has long maintained a strong connection with the manufacturing side of the plastics industry, since it makes grinding, mixing and sifting machines eminently suitable for the production of powdered resins and similar materials. Here were shown a great variety of sifters and powder dressers, rotating porcelain ball-mills and edge-runner mills and mixers for the plastics, lacquer and similar industries. Many of these are now being employed for incorporated resins with fillers and for dissolving resins in solvents.

We saw little, however, of new shapes in plastics, although the new colorimeter of Lovibonds, made almost entirely of moulded phenol-formaldehyde powder, is especially deserving of notice since, moreover, it is hoped to interest the plastic industry as a colorimeter for evaluating colours. There was also the ingeniously designed Delavelle bottle which we refer to in our "Ideas" page.

The imposing stand of the United Glass Bottle Manufacturers, Ltd., at the recent Chemists' Exhibition, Albert Hall, London.

New Nestle hair drier made of transparent Celastoid.

At the Building Exhibition, the two outstanding exhibits relating to the plastics industry were those of Bakelite, Ltd., and of the Dap Manufacturing Co. The stand of Bakelite, Ltd., was especially arresting since it showed a very complete range of veneers suitable as

A comprehensive range of sifting, mixing and grinding machines on the stand of W. Gardner and Sons, Ltd.

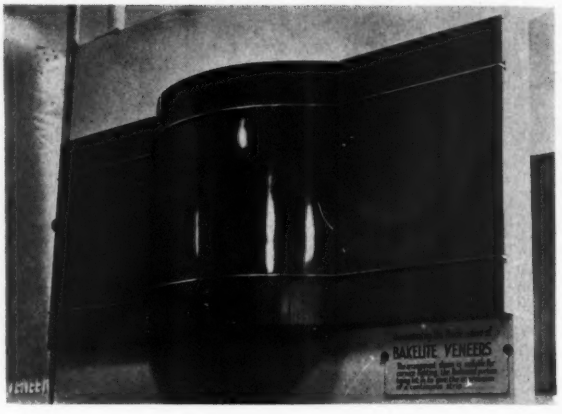
Side view of the stand of Bakelite, Ltd., showing demonstration panels and veneers.

wall-panels and for the construction of doors. The accompanying photograph shows the remarkable designs that are available. Of special interest here was the new development of the curved veneer which admirably demonstrates the pliable nature of this material. There was also an excellent demonstration of the resistance Bakelite veneers offer to various liquids by the showing of a number of glass vessels containing water, fruit juice, vinegar and beer in which veneer strips were dipped by a clockwork arrangement every second or so.

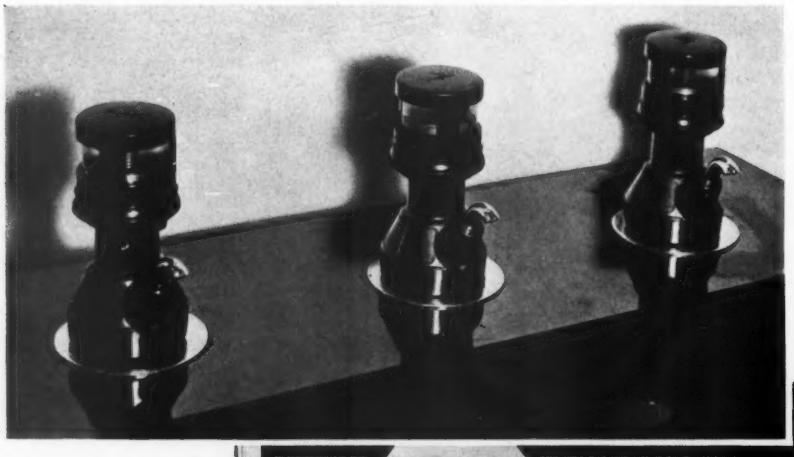
The other noteworthy stand was that of the Dap Manufacturing Co. displaying the development of extruded runners of many shapes. This subject is discussed on another page.

We visited the Hairdressers' Exhibition merely to see in action the new transparent hair-drier we gave publicity to last month, at the stand of C. Nestlé and Co. This, as our readers may remember, was constructed of Celastoid, the well-known cellulose acetate sheet made by British Celanese, Ltd. It was fabricated for C. Nestlé and Co. by Albert Optical Co., of Albert Street, N.W.1.

Also worthy of mention is the mobile shampoo wagon shown at the stand of Serventi, Ltd., 61, Beak Street, London, W.1. The Rapid Measure devices fitted on the top of the wagon are moulded of phenolic resin.



The arrangement of Bakelite veneers illustrated is suitable for cornice lighting, the Radiused portion being let in to give the impression of a continuous strip.



Close-up of the Rapid Measure devices moulded of phenol formaldehyde resin.

The mobile shampoo unit in use. It is made by Serventi, Ltd., 61, Beak Street, W.1.

Inquiries and Answers

Door Spring Barrels

Birmingham.

The Editor, *Plastics*.

Dear Sir,—We should be glad to know if it would be possible for the barrel portion of the door spring, illustration of which we enclose, could be made in plastics. It would have to be strong enough to stand the oil pressure and the stresses of expansion and contraction of the inner coil spring. We should be pleased if you could give us any information on this matter.

P.W. AND A., LTD.

[EDITOR'S NOTE.—Two designs of the door spring were sent, one small with a simple barrel, the other large with a more complicated barrel. It is possible that the small one might be constructed by extruded tube if an oil-tight base could be fixed to it. Otherwise both types, we believe, could readily be made by normal moulding practice from moulding powders. Robust construction would readily withstand the pressure of the oil and of the inner coil spring.]

Printing Blocks

New York.

The Editor, *Plastics*.

Dear Sir,—Could you send us any information concerning the etching with a mordant or acid of plastic material? We have been given to understand that half-tone engravings are being made of plastics abroad. This may be in Germany. We would like to get information concerning the material and the solvent.

INTERNATIONAL RESEARCH LABORATORIES.

[EDITOR'S NOTE.—We have no information regarding the production of half-tone engravings from plastic sheets by a process similar to the normal etching of a sensitized copper plate. We do not believe that acids would have much effect, since most plastics are acid-resistant. Caustic soda attacks phenol-formaldehyde resin, but the action would be slow and would not attack the filler. Thus the etched lines would not be clean-cut. Similarly, organic solvents attack cellulose-acetate sheets, but we feel convinced the result would be poor.

The half-tone engravings produced in Germany and in this country (see June, 1938, issue, p. 198) are made by impressing a sheet of specially prepared resin on to a metal engraving. The new process relates rather to stereos than to originals.]

Luminous Paint

London, S.W.4.

The Editor, *Plastics*.

Dear Sir,—I am interested in luminous plastics, which, I believe, are being used in France in connection with advertising signs. I should be very grateful for any information you can supply in this regard, and should be interested to know if there is a reliable plastic paint suitable for spraying on metal in existence, and who markets it.

P.L.J.

[EDITOR'S NOTE.—We discussed luminous plastics in several issues of this journal, notably in our October, 1937, issue, but the luminous plastics moulded from powder containing barium sulphide, etc., is not what the inquirer means. We presume he refers to those paints which possess thixotropic property, that is, the property of "staying put" and not flowing out into a film. These are now widely used in interior decoration, especially for cinemas, hotels, etc. This does not come within the scope of our journal, but no doubt such a paint could be made luminous. The reader should apply to Scott, Bader and Co., Ltd., 109, Kingsway, who market a French product, or apply to the Editor of *Paint Technology* or *Paint Manufacture*, both published in London.]

Plastics in Rod or Strip Form

Bradford.

The Editor, *Plastics*.

Dear Sir,—Can you please give me the names of one or two firms supplying plastics in the form of rods or strips?

G.L.

[EDITOR'S NOTE.—We should be glad to know for what purposes the rods or strips are to be used. For electrical purposes rod and strips are obtainable made up from impregnated paper or fabric. These can be obtained from Bakelite, Ltd., Ellison Insulations, Ltd., etc. For other purposes there is a wide selection—casein rods, tubes, and sheet from British Xylonite Co., Ltd., and Erinoid, Ltd., amino-resin extruded tube and rod from British Industrial Plastics, Ltd., and phenol formaldehyde resin rod and tube from F. A. Hughes and Co. Strips of cellulose acetate of varying thickness are also available from May and Baker, Ltd., British Celanese Co., Ltd., Phipps Plastic Products, Ltd., etc. Rods of cellulose acetate are probably also available.]

Injection Moulders

Birmingham.

The Editor, *Plastics*.

Dear Sir,—I am desirous of getting in touch with a firm who do injection moulding in South Wales, and should esteem it a favour if you could inform me of any names of companies who do this type of work.

E.C.F.

[EDITOR'S NOTE.—We regret we have been unable to trace any concern that moulds by the injection process in South Wales.]

Salt Dispenser

St. Louis, Mo.

The Editor, *Plastics*.

Dear Sir,—We appreciate very much the complimentary issue of *Plastics*, September issue, 1938, and the courtesy in mentioning our item on page 296. This unit has answered the various questions we had in mind, and has proven very acceptable to users. We have no monopoly on this item, although we pioneered the service, but there are now a number of units made of various materials, and this plastic unit is a successor to our former items made of aluminium or aluminium combination with glass hoppers. We express again our appreciation for the complimentary notice.

Very truly yours,

FAIRWAY LABORATORIES, INC.

TRADE AND PERSONAL NOTES

Alfred Herbert, Ltd., Coventry, have sent us the July-August issue of *The Machine-Tool Review*, which, as usual, contains a number of very interesting articles. There is a particularly sound article describing a new Zeiss microscope for measuring Brinell impressions which should prove of interest to tool makers in the plastics industry. The Zeiss microscope is so designed that Brinell impressions can be measured with a high degree of accuracy. The instrument is fitted with illumination which supplies partly diffused light. The result of this is that the spherical indentation stands out clear and sharp from a dark surrounding area, thus enabling focusing errors to be avoided and making very precise measurements possible.

Plastic Developments Sales, Ltd., have forwarded us their revised price list and catalogue, which contains a number of moulded articles very suitable for home or hotel use. We should imagine that the hearth suites, smokers' companion sets and afternoon trays would be very welcome in the modern hotel.

British Cellophane, Ltd., have forwarded us the August issue of their house journal entitled *20th Century*. There are a number of brightly written and informative articles, and one in particular dealing with frozen foodstuffs which will soon be on sale in this country. Incidentally, this company had an impressive stand at the Confectionery Exhibition, held at Earls Court from August 31 to September 8, 1938, which covered 500 sq. ft. The colour scheme was white, and a gay, colourful note was supplied by the rolls of coloured "Cellophane" film, which formed an integral part of the stand design.

The Canadian National Exhibition in Toronto will have a stand at which will be shown a miniature "Cellophane" cast machine, 40 ins. long and 20 ins. high, designed and built for the Exhibition, and which will make a continuous ribbon of "Cellophane" 2½ ins. wide. The exhibit will be on the stand of Canadian Industries, Ltd.

McGraw-Hill Publishing Co., Ltd., have just published an interesting text book for the engineering student. It is entitled "Design of Machine Members," by A. Vallance, and costs 24s. The 23 chapters include engineering materials, factors of safety, utilization factors, working stresses and design of numerous machine parts.

The Chemists Exhibition was held at the Royal Albert Hall on September 19-23, 1938, and visited by a large number of the trade..

Imperial Chemical Industries of Australia and New Zealand, Ltd., are erecting a new synthetic ammonia plant at Deer Park, Victoria, which will cost £500,000. It is expected that the availability of cheap ammonia will help considerably the plastic raw-material industry.

Mr. E. A. Norris, who is so well known to the plastics industry, has joined G. E. Marbaix, Ltd., Humglas House, 22, Carlisle Place, London, S.W.1, and has been appointed special representative for the H.P.M. hydraulic-injection moulding press.

The Department of Overseas Trade informs us that radio-electric apparatus and wireless and any other apparatus employing electro-magnetic waves, including wireless sets and their spare parts, may now be imported into Roumania on compensation. Compressors and pumps also come into the same category, namely, List B. of approved goods.

The Steel Barrel Co., Ltd., Uxbridge, Middlesex, have sent us particulars of their many types of containers, which include steel casks, drums, taper cans, storage and transport tanks in stainless steel, mild steel and aluminium. Several of these containers find important application in the plastic industry for the transportation of resins.

Metal Propellers, Ltd., Purley Way, Croydon, Surrey, have just issued a useful and interesting little booklet, specially written for every user of stainless steel equipment. Works managers and engineers can obtain a copy on application to the company at the above address.

Howards and Sons, Ltd., Ilford, near London, offer sodium lactate (technical 80%), which they recommend as a glycerine substitute for plasticizing casein. It is a viscous liquid, completely soluble in water, stable in steam, and non-volatile; considerably more hygroscopic than glycerine and stable in price. Samples and prices can be obtained on request from the manufacturers.

Department of Scientific and Industrial Research has just forwarded us the Report of the Chemistry Research Board for the Triennial Period ended December 31, 1937, which is published by H.M. Stationery Office, 3s. net. The Report contains a good deal of new matter about plastics research.

Crystalate, Ltd., inform us that they have recently added another large press to their equipment to quote against inquiries for mouldings of the largest sizes. The firm has also added two new milling machines to their toolroom equipment.

Trade Board for Rubber Industry was mentioned in a notice in the *London Gazette*, August 3, 1938, in which the Minister of Labour stated that as no objections were received to the proposal, the application of the Trade Board Acts to the rubber manufacturing trade was to take effect from October 3, 1938. It is understood that the Minister of Labour will take steps in the near future, in consultation with the responsible associations of employers and trade unions, to set up a trade board. It is intended to set up one board to deal with the whole of the manufacturing side of the industry, but in view of the fact that the regeneration of waste rubber is largely in the hands of specialist firms, a separate trade board will be established for this section of the trade.

British Drug Houses, Ltd., Graham Street, London, N.1, have just issued a new priced catalogue of B.D.H. laboratory chemicals and outfits which totals 200 pages and is conveniently thumb-indexed under the subjects; chemicals, reagents, indicators, laboratory, sundries, etc.

Davidson and Co., Ltd., Sirocco Engineering Works, Belfast, inform us that their new publication (Ref. No. SF.212) is now available. It deals with many of the firm's well-known products, including Sirocco cased fans, dust fans, high-pressure and reversible propeller fans, pneumatic conveyance plant, air-conditioning installation, etc.

International Combustion, Ltd., of Aldwych House, Aldwych, London, W.C.2, have sent us some interesting particulars regarding the Hardinge Conical Ball mills. These mills will operate in open or closed circuit and on wet or dry grinding systems.

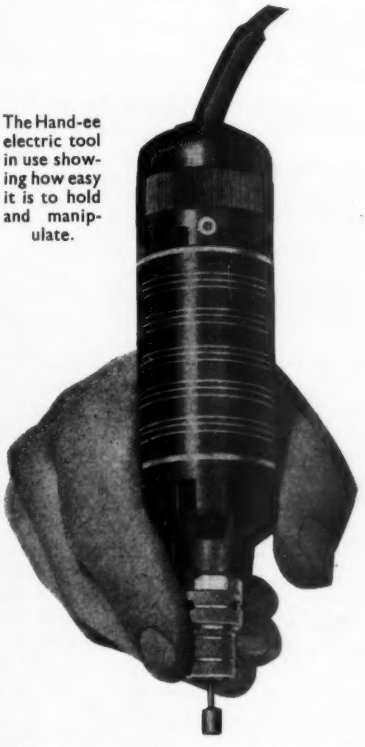
The Hull Development Committee reports the successful negotiations for increased factory space by two new industries recently started in Hull. They inform us that this enterprising seaport offers excellent facilities for all new industries, such as plastics.

Permastic, Ltd., Woodham Works, King's Road, New Haw, Weybridge, Surrey, held a statutory meeting of creditors, when a statement of affairs was submitted which showed that assets were estimated to realize £3,686, and they were subject to preferential claims of £95, leaving a balance of £3,591, all of which is absorbed by the claims of the debenture holders. The unsecured liabilities were set down at £38,955, with a deficiency of the same amount. Resolutions were passed confirming the voluntary liquidation of the company, with Mr. J. Cooper, 567-9, Fulham Road, London, S.W., as the liquidator.

NEW MATERIALS—NEW PLANT—NEW METHODS

The Hand-ee Tool

Charles Churchill and Co., Ltd., have just sent us their latest brochure describing the Hand-ee electric hand tool illustrated below. This tool is finding literally hundreds of applications and should be available for use by every plastic moulder and die manufacturer. A large number of accessories are available, and these include grinding wheels, sanding drums, saws, felt polishing wheels, rubber polishing points, as well as Wolfram-Vanadium alloy steel cutters.



The Hand-ee electric tool in use showing how easy it is to hold and manipulate.

There is a de luxe model which sells at £9 15s. complete and is supplied with a right-angle head. The latter is invaluable for maintenance work and repairing machinery. Only ⅜ in. free room is required for the operation of this device. Hand-ee tools are submitted to a rigid inspection and running test before leaving the factory. They leave the factory in perfect condition and are guaranteed to give real, dependable service.

Exhaust Fans of Improved Design

One of the provisions of the new Factories Act, which came into force on July 1, makes effective ventilation a legal necessity in all factories and workshops. Although proper ventilation has long been recognized as indispensable to the maximum productive efficiency, there are large numbers of factories where it has been regarded as impracticable, and incomplete schemes with makeshift equipment have had to suffice. This is, however, a mistaken policy, and a comparatively small expenditure on modern exhaust fans would amply repay the owners of the buildings where work is being carried on.

The range of Genalex exhaust fans sold by the General Electric Co., Ltd., of Magnet House, Kingsway, London, W.C.2, has been developed as a result of continuous experience over a long period of years, and the Genalex fan of to-day sets a new standard in exhaust-fan design and provides the most convenient and economical way of ventilating industrial and other buildings.

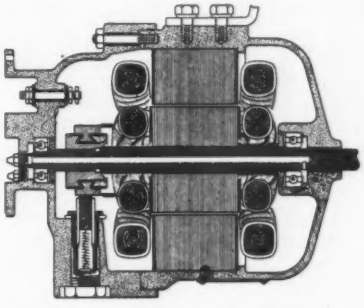
This year's Genalex exhaust fans embody many improvements, principally in the direction of high efficiency, quiet operation, reliability and appearance. The exceptionally high performance of the fan blade enables the required air displacement to be obtained with a relatively low peripheral speed, thus minimizing power consumption and lowering the first cost. Furthermore, the single-phase fans are now fitted with high-efficiency switchless capacitor motors, thus greatly reducing the cost of running. Up to 18 ins. diameter the continuously rated condenser is built into the end of the motor (opposite the fan end); neatness of appearance is thus achieved, whilst wiring and erection are simplified.

An important advance towards quietness of operation has been made by the introduction of resilient mounting; transmission of noise or vibration to the fixing surface is prevented by rubber cushions inserted between the fixing arms and the ring.

The use of a four-arm motor support provides a more rigid assembly and the new four-lug ring facilitates erection. Unusual accessibility for wiring is obtained by the use of a new type of terminal block, cable gland, and earth clip; all motors are provided with lubricators which are easily accessible. On d.c. machines provision is made for inspection and servicing by means of a removable "pot" on the smaller motors and by removable doors on the larger machines.

It may be noted that the d.c. fan motor is of entirely new design, the outstanding features being easy access to commutator and brushgear, substantial die-cast brush holders on moulded Bakelite carriers, and detachable laminated poles with moulded Bakelite field spools.

Improved appearance has been obtained by designing the motors with



Section through motor of Genalex d.c. flameproof exhaust fan showing method of lubrication.

a smooth contour, by employing a finish to match Silverlac conduit, and by the use of a four-lug fan ring.

Special types of fans are available for diaphragm mounting, in flameproof designs (for operating in petrol stores, cellulose spray booths, dry-cleauing plants and similar situations where the air is of an inflammable character), and for operating in hot gases or refrigerator chambers.

An important feature of the Genalex flameproof fan is the special method of lubrication, which is covered by the Buxton Certificate. Although this point has an obvious bearing upon the reliability of an exhaust fan, which is frequently required to run for long periods with the minimum of attention, many flameproof motors have no means of lubrication, owing to the difficulty in complying with the flameproof regulations, which will not permit exposed grease cups or nipples.

Mould Lubricant

Sextol stearate, made by Howards and Sons, Ltd., Ilford, near London, is recommended by the manufacturers as a mould lubricant and also as a plasticizer for chlorinated rubber. It can be used with all phenol formaldehyde resins, vinyl resins, and shellac. The stearate is a pale yellow, oily liquid of a particularly stable character. Boiling range is 220 to 240 degrees C./4 mm., and it is completely stable, non-inflammable, and does not attack metals.

PATENTS RELATING TO PLASTICS

These abridgments of recently published specifications are specially compiled for this journal by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet, as issued, on payment of 5s. per group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address, price 1s. each.

484,576. Proofing Permeable Materials

NATIONAL PROCESSES, LTD., and CARTER, W. J. November 5, 1936.

Fibrous materials such as fibres, slivers, rovings, threads, yarns, woven, knitted or netted fabrics of cotton, jute, flax, sisal, phormium tenax, ramie, silk or rayon, paper, paper pulp or paper boards, fibre or fibre boards, are simultaneously rotproofed and sized by treating them with a metallic salt or ester of naphthenic acid or a mixture thereof dispersed in an aqueous vehicle which will not coagulate the sizing liquid, e.g., a resin-wax size. In a modification the materials are treated with an aqueous dispersion of the rotproofing agent prior to sizing. Suitable rotproofing agents are aluminium and zinc naphthenates. In sizing paper zinc naphthenate in the form of a plastic solid is mixed with the molten sizing materials from which an aqueous liquor is then made. Alternatively the naphthenate is dispersed in water by means of an alkali such as ammonia, the paper impregnated therewith and subsequently sized. Textile materials may be oiled after rotproofing and before sizing. The rotproofed and sized material may be treated with a waterproofing agent such as rubber latex comprising vulcanizing agents and accelerators or a vulcanized latex may be used.

486,243. Alkali Cellulose

COURTAULDS, LTD., STOKES, W. H., and MORTON, E. A. March 31, 1937.

Alkali cellulose is produced by passing a continuous sheet of cellulose through a mercerizing bath, subjecting the impregnated sheet to light pressure to remove part of the excess bath solution, and finally drying it by applying pressure to it while in contact with non-impregnated cellulose. The drying process may be carried out by passing the impregnated sheet, with a continuous sheet of non-impregnated cellulose in contact with each face, through squeezing rollers. The partly impregnated drying sheets can be completely impregnated by the same process, while the impregnated cellulose sheet formed may be milled or ground into small pieces at once or after a period of ripening. The cellulose sheet may be corrugated before entering the mercerizing bath.

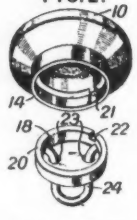
486,987. Moulded Buttons

MOULDED PRODUCTS, LTD., and IRELAND, H. W. F. March 4, 1937.

A button comprises a front portion 10 of moulded material such as synthetic resin in the back of which is moulded a tubular anchorage member 14, into which is inserted an attachment unit consisting of a metal cup 18 carrying a U-shaped shank 24 loosely in holes 23, the outer edge of the anchorage member then being turned down to secure the cup. The cup may have a notch 22 engaging with a corresponding projection 21 on the shoulder 20 of the moulded portion to prevent turning movement. In place of the U-shank, a single stem with an eye may be used. In a modification (not shown), the rear part of the anchorage member 14 is contracted and an exterior groove is formed on it after the moulding operation, and the edge of the member 18 is spun into this groove.

FIG. 1.

FIG. 2.

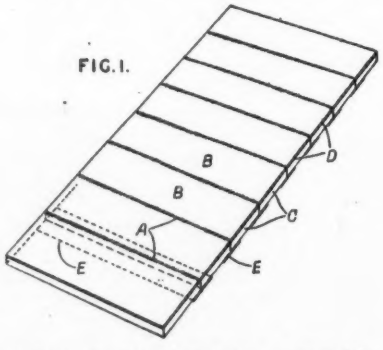


486,776. Compound Sheet Materials

MORTON SUNDOUR FABRICS, LTD., and SIMPSON, R. D. December 9, 1936.

Compound sheet material for surfaces for indoor bowling greens, tennis or badminton courts, clock golf, etc., comprises a fabric B presenting a cut

FIG. 1.



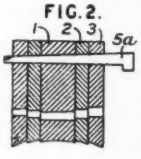
velvet pile face united to a carpet felt backing C and an intermediate reinforcing layer of loose-texture fabric D such as hessian by means of an adhesive such as latex. The pile facing, woven on a double plush loom from worsted or mohair is coated thickly on the back with latex, and the loosely woven fabric and felt applied in succession. Strips of the compound sheet material are sewn together by stitching A penetrating the edges of the pile fabric and loosely woven fabric, and are also joined at the back by strips E of thin cotton scrim united to the felt by latex. The pile fabric may be dyed green to simulate grass.

485,629. Moulding Lenses, Etc.

WILLIAMS, W. E. November 21, 1936.

Fresnel lenses, mirrors and like optical devices having surfaces or centres of curvature of different regions relatively displaced along the chief optical axis are moulded by pressing "plastic glass" at a temperature of 100-200 degrees C. between polished metal dies, which have been corrected as set out in the parent Specification, and one of the dies is formed of a number of components 1, 2, 3, which are axially relatively displaceable so as to present the required displacement of different regions of the lens. The corrected lens shape is imparted collectively to the assembled components 1, 2, 3. The material may be that known under the Registered Trade Mark "Perspex." The die may comprise a central rod 1 and close-fitting tubes 2, 3 all of annealed iron or steel. The parts are assembled and held by a wedge and one end face is given a stepped formation. The other face is worked and corrected to provide the required surface. The wedge is then removed and the parts displaced.

FIG. 2.



486,534. Compound Paper

BUSHING CO., LTD., and BROWN, W. J. December 4, 1936.

Electric bushings, etc., are made by sizing paper by adding saponified or finely ground phenol or cresol formaldehyde resin to the pulp during the beating process, fabricating paper therefrom, coating the sheets with further synthetic resin of the same type, e.g., as varnish, assembling the sheets and uniting them by heat and pressure. The sheets may be wound on a mandrel, and concentric shells of metal foil included.

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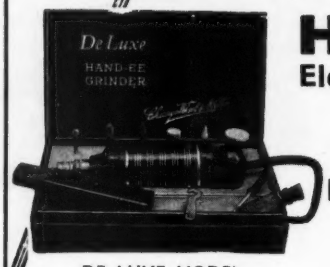

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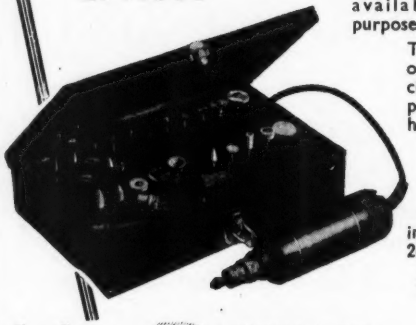

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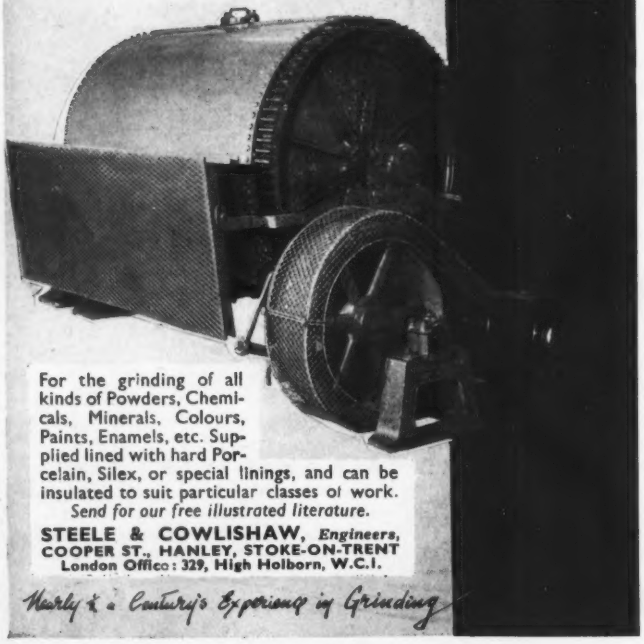

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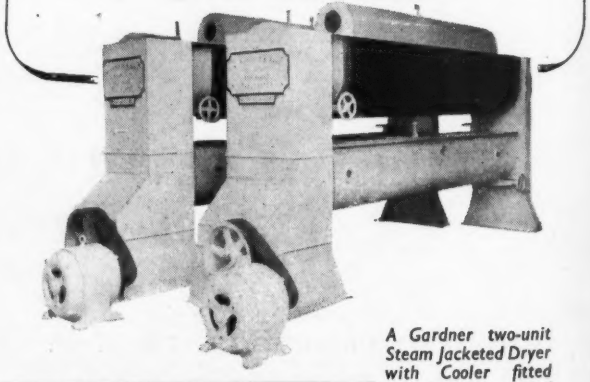

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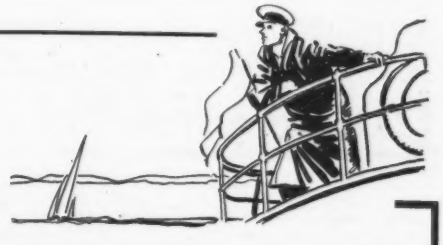

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IN THE HIGH COURT OF JUSTICE **1938 B. No. 2786**

KING'S BENCH DIVISION

BETWEEN:

BRITISH INDUSTRIAL PLASTICS LIMITED *Plaintiffs*

and

H. ALLEN (Male) *Defendant*

To the above named Defendant H. Allen (Male)

TAKE NOTICE that this action was on the 7th day of July 1938 commenced against you and that the Plaintiffs by their Writ of Summons claim against you £1,136.16.4 as guarantor for the price of goods sold and delivered by the Plaintiffs to Mouldcraft Limited under a guarantee in writing signed by you and dated 21st day of July 1937.

AND TAKE NOTICE that the Court has by order dated the 8th day of September 1938 authorised service of the said Writ of Summons on you by the insertion of this notice once in the "Daily Telegraph," "Plastics" and "British Plastics" papers.

AND FURTHER TAKE NOTICE that you are required within eight days after the insertion of this advertisement inclusive of the day of such insertion to cause an appearance to be entered for you at the Central Office Royal Courts of Justice Strand London and that in default of your so doing the Plaintiffs may proceed with this action and judgment may be given against you in your absence.

DATED the 14th September 1938.

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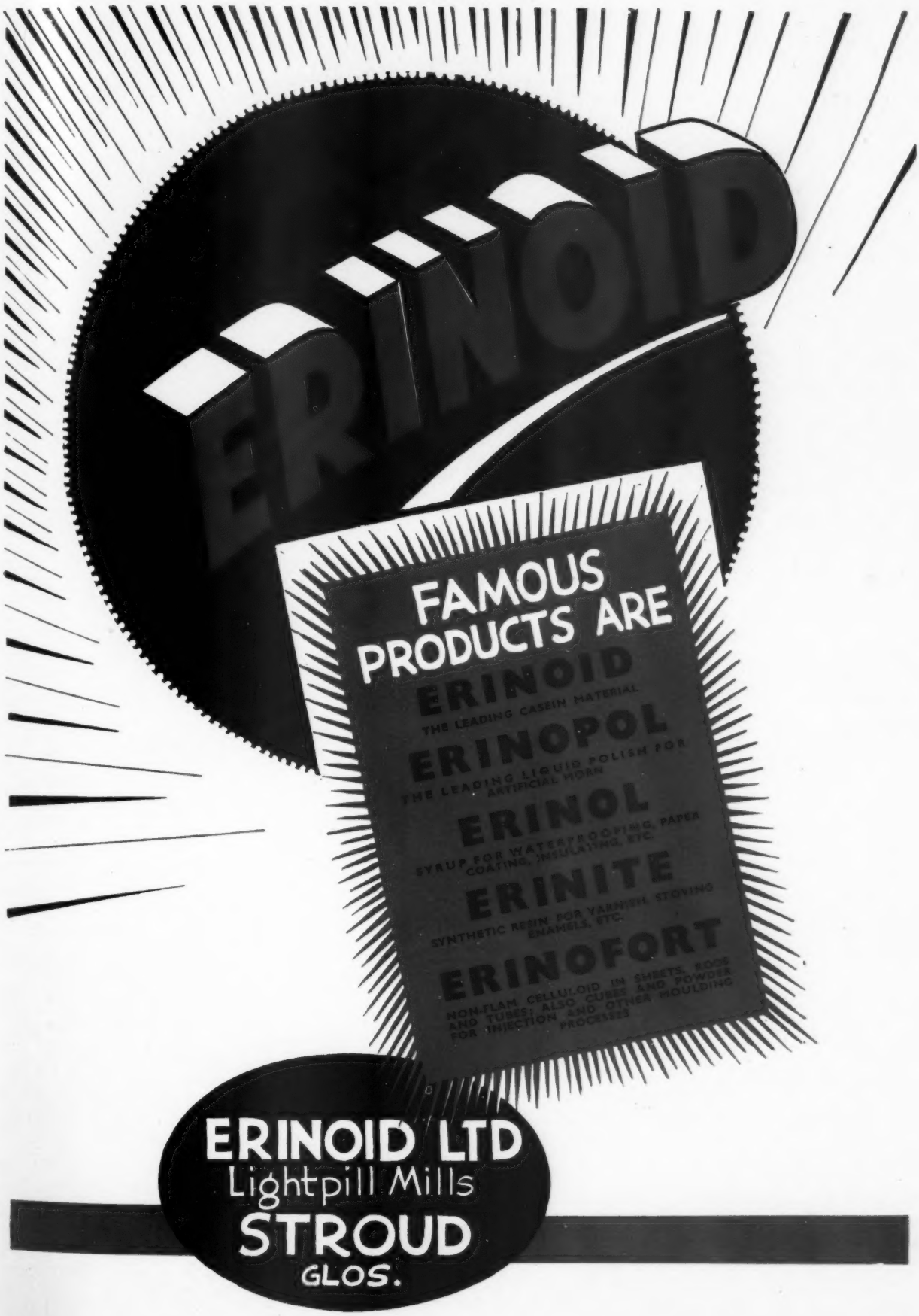
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